

WINTER USE PLANS

Draft Supplemental Environmental Impact Statement

Volume 1

**YELLOWSTONE AND GRAND TETON NATIONAL PARKS
AND THE JOHN D. ROCKEFELLER, JR., MEMORIAL PARKWAY**

Winter Use Plans
Supplemental Draft Environmental Impact Statement
*For the Yellowstone and
Grand Teton National Parks
And John D. Rockefeller, Jr., Memorial Parkway*

*Prepared by the U.S. Department of Interior, National Park Service
in Cooperation with the U.S. Forest Service, the Environmental Protection Agency,
the States of Montana, Wyoming and Idaho, and the
Counties of Gallatin and Park in Montana, Fremont in Idaho, and Park and Teton in
Wyoming*

March 29, 2002

This document supplements the Final Environmental Impact Statement (FEIS) for winter use plans of Yellowstone and Grand Teton National Parks, and the John D. Rockefeller, Jr. Memorial Parkway, published in October, 2000. A record of decision resulting from the FEIS was signed on November 22, 2000, selecting Alternative G from the FEIS. This decision phases out the use of snowmobiles in the three park units over three years, and provides for over-snow access by snowcoach only beginning the winter of 2003-2004.

The supplemental EIS (SEIS) process is intended to elicit more public comment on the decision previously made, and to evaluate new information provided by snowmobile manufacturers relating to a new generation of snowmobiles that produce fewer emissions and are quieter. Other relevant updated or new information available subsequent to the previous decision is considered in this SEIS.

This SEIS evaluates three alternatives to the previous decision, which is incorporated in this document as the current management or "no action" alternative. Alternative 1a is "no action". Alternative 1b is the same as Alternative 1a in terms of management, but implementation is delayed for a year. Alternative 2 is an alternative that maintains snowmobile use on all existing snow roads, but at a reduced level in three years from the West Entrance and potentially increased levels from other entrances, but uses new technology that reduces emissions and sound from snowmobiles. Alternative 3 is an alternative that allows snowmobiles on all major, but not all, snow roads, using new technology, and at reduced use levels in some areas. All alternatives represent adaptive management approaches, but they propose different starting points for the use of technology and the levels of visitation and access.

The details of the alternatives and their effects, using updated or new and relevant information, and tiering as necessary to the FEIS, are disclosed in this document. Based on this supplemental evaluation of impacts, National Park Service decision-makers will determine whether to affirm the previous decision about how to manage winter use in the parks, or make a new decision.

To ask questions about this EIS process, contact Planners at Grand Teton National Park, PO Drawer 170, Moose, WY 83012 (Phone: (307) 739-3467 or 739-3321). The NPS is requesting comments on this draft SEIS that relate qualitatively and specifically to the alternatives or the analysis. To be considered, comments must be in writing, including the name and postal address of the writer. **Comments must be received at the address below no later than midnight, Mountain Time, May 29, 2002.** To meet a court approved deadline, comments received after this time cannot be considered, and the comment period cannot be extended. Faxed comments will not be considered. Though all names and addresses will remain part of the public record, reasonable written requests by a commenter to remain anonymous will be considered by NPS to the extent allowed by law.

Written comments should be addressed to: Winter Use Draft SEIS Comments
Grand Teton and Yellowstone National Parks
PO Box 352
Moose, WY 83012

SUMMARY OF THE SEIS

INTRODUCTION

The National Park Service (NPS) has been dealing with winter use issues for several decades. More recently, these issues have resulted in intensive study and public involvement. In 1990 a Winter Use Plan was completed for Yellowstone National Park (YNP), Grand Teton National Park (GTNP), and the John D. Rockefeller, Jr., Memorial Parkway (the Parkway). In 1994 the Greater Yellowstone Coordinating Committee (GYCC - the National Park Service and U.S. Forest Service) began work on an interagency assessment of winter use issues culminating in the 1999 final report, *Winter Visitor Use Management: a Multi-agency Assessment*. In 1997, the Fund for Animals filed suit against the National Park Service (NPS), the settlement of which required NPS to produce an EIS and make a new decision on winter use. The FEIS was published, and a record of decision (ROD) was subsequently signed on November 22, 2000. The decision eliminated recreational snowmobile and snowplane use from the parks by the winter of 2003-2004.

On December 6, 2000, a lawsuit brought by the International Snowmobile Manufacturers Association asked for the decision to be set aside on the basis of NEPA process infractions. The Office of the Secretary of Interior negotiated a procedural settlement which became final on June 29, 2001. As provided in that settlement agreement, NPS is acting as lead agency to prepare this Supplemental Environmental Impact Statement (SEIS), and the State of Wyoming is acting as a cooperating agency. Subsequent to the settlement, all other agencies who signed cooperating agency agreements during the earlier EIS process agreed to be cooperating agencies for the Supplemental EIS. These agencies are: the U.S. Forest Service, the States of Montana and Idaho, Fremont County in Idaho, Gallatin and Park Counties in Montana, and Park and Teton Counties in Wyoming. In addition, the Environmental Protection Agency (EPA) has become a new cooperating agency in this effort.

THE PURPOSE OF THE SUPPLEMENTAL EIS (SEIS)

The purpose for preparing this Supplemental EIS is to further the purposes of NEPA by soliciting more public comment on the earlier decision and alternatives to it. Additional information from the International Snowmobile Manufacturers Association will be considered, as well as any other relevant new or updated information not available at the time of the earlier decision. The fundamental purpose and need for action in the supplemental analysis remains the same as in the FEIS, and the FEIS is liberally referenced in the SEIS, rather than repeating much of the same information. The SEIS focuses on three alternatives to the existing decision, seeking a means of allowing snowmobiles into the parks or deferring implementation of the existing decision.

NATIONAL PARK SERVICE MANDATES

In the context of this SEIS, a body of public laws, Executive Orders, regulations, and directives of the Secretary of the Interior and the Assistant Secretary for Fish and Wildlife and Parks represent objectives to be achieved in winter use management. Chief among the laws are The Organic Act, The General Authorities Act, the Yellowstone National Park Act, the Grand Teton National Park Act, and the John D. Rockefeller, Jr., Memorial Parkway Act, The Clean Air Act, and the Endangered Species Act. Executive orders that provide additional context and direction are EO 11644, Use of Off-Road Vehicles on the Public Lands, and the executive order that amends it, EO 11989. By NPS regulation (36 CFR 2.18), snowmobiling is generally prohibited except on designated routes and water surfaces available for motorized use at other times. In addition, snowmobiles are prohibited except where designated and “only when their use is consistent with the park’s natural, cultural, scenic and aesthetic values, safety considerations, park management objectives, and will not disturb wildlife or damage park resources.”

Current policy guidance for NPS is published in *Management Policies 2001*. The policies are consistent with laws, regulations and executive orders, and reference these governing mandates liberally. Policies most applicable to this SEIS and the existing decision are listed here.

- 1.4.3 The NPS Obligation to Conserve and Provide for Enjoyment of Park Resources and Values
- 1.4.4 The Prohibition on Impairment of Park Resources and Values
- 1.4.5 What Constitutes Impairment of Park Resources and Values
- 1.4.6 What Constitutes Park Resources and Values
- 1.4.7 Decision-making Requirements to Avoid Impairments
- 4.7.1 Air Quality
- 4.9 Soundscape Management

- 8.2 Visitor Use
- 8.2.3 Use of Motorized Equipment
- 8.2.3.1 Off-road Vehicle Use
- 8.2.3.2 Snowmobiles

PURPOSE AND NEED FOR ACTION

The purpose and need for action as the basis for this SEIS, in accordance with CEQ regulations (40 CFR 1502.13), is the same as that for the previous FEIS. The fundamental purpose and need for action is framed by a set of desired conditions, compared to existing conditions. The desired conditions are distilled from the large body of laws, regulations, executive orders, and policies that are summarized above. Desired conditions or objectives for winter use management are:

- Visitors have a range of appropriate winter recreation opportunities from primitive to developed. Winter recreation complements the unique characteristics of each landscape within the ecosystem.
- Recreational experiences are offered in an appropriate setting; they do not take place where they will irreparably impact air quality, wildlife, cultural areas, the experiences of other parks' visitors, or other parks' values and resources.
- High quality facilities are provided in parks to support the need for safety and enhanced visitor experiences.
- Conflicts among user groups are minimal.
- Visitors know how to participate safely in winter use activities without damaging resources.
- Oversnow vehicle sound and emission levels are reduced to protect employee and public health and safety, enhance visitor experience, and protect natural resources.

Existing conditions, supported by information in the FEIS are:

- **Visitor Access:** Access to most locations is limited to those who can afford to ride a snowcoach or snowmobile. Access for personal motorized use via snowmobile has increased greatly since the beginnings of the winter program in the three parks. Snowmobile use, in current numbers, is in conflict with use of parks' facilities by other user groups.
- **Visitor Experience:** A variety of winter use conflicts has been identified involving the relationship between users and among different user groups, which affects how people experience the parks. At destination facilities and trails open to both motorized and nonmotorized users, nonmotorized users express dissatisfaction with the sound, odor, and quantity of snowmobiles. These vehicles affect the solitude, quiet, and clean air and other resource values that many people expect and wish to enjoy in national parks.
- **Visitor Safety:** The current level of snowmobile accidents, unsafe users, inherent winter risks, and conflicts between users are of concern from the standpoint of public safety.
- **Resources:** Parks have documented health hazards from snowmachine emissions, harassment and unintended impacts on wildlife from groomed trails and their use, degradation of air quality-related values, and impacts on the natural soundscape. Many people strongly object to the degradation of inherent parks' values, as well as how these impacts affect people and their recreational opportunities.

SCOPE OF ANALYSIS — RANGE OF ALTERNATIVES CONSIDERED

The scope of analysis determines the range of alternatives to be considered. Pages 7-8 in the FEIS describe the scope of analysis resulting in the seven alternatives evaluated in that document. The analysis in this SEIS is limited to two alternatives that would allow snowmobile recreation to continue in the parks on the basis of improved snowmobile technology or other measures that address the adverse impacts of snowmobile use disclosed in the FEIS. In accordance with the settlement agreement, the SEIS specifically evaluates technological improvements in snowmobile technology to address air resource issues and soundscape issues. The scope of the analysis incorporates the need to eliminate or successfully mitigate impacts of snowmobile use, in addition to emissions and noise, on wildlife and visitor experience. The scope of analysis does not include portions of the earlier decision regarding non-motorized winter use. Since the driving force consists of information on new snowmobile technology, there is no reason to reevaluate non-motorized use decisions. In similar fashion, a number of features incorporated into the earlier decision do not require reanalysis because they would apply consistently to all alternatives in the SEIS, and because they are supported by environmental analysis in the FEIS.

DECISION TO BE MADE

The “no action” alternative in this SEIS is represented by the decision currently in place and documented by a record of decision published in November of 2000. The settlement agreement represents direction to engage in a process to reconsider this recent decision based on information about new snowmobile technology. Therefore, the decision to be made – based on consideration of information and alternatives in both the FEIS and the SEIS – is whether to affirm the previous decision or to make a new one. The nature of the decision to be made remains essentially the same as described in the FEIS, to determine which alternative best meets the purpose and need for action summarized above. In light of the need to do an SEIS, resulting from a lengthy settlement negotiation process, time has been taken away from the schedule for implementing the earlier decision. Therefore, the SEIS also considers an alternative to the existing decision which allows more time for implementing the program put forward in that decision. So, part of the decision to be made is to delay implementing the earlier decision, if that decision is affirmed.

PUBLIC COMMENTS

The Federal Register Notice of Intent (NOI) to prepare a supplemental EIS invited public comments on the earlier decision and alternatives to it, as well as any new information.

Comments made in response to the NOI supplement the many comments received during the earlier EIS process, summarized on pages 9-11 of the FEIS. The body of comment responding to the NOI includes little substantive information beyond that disclosed in the earlier DEIS and FEIS, or received following the FEIS and ROD.

MAJOR ISSUES

The FEIS describes five major issues that relate to the purpose and need for action for the future of winter use in the three NPS units. The purpose of developing alternatives is to look at and compare different means for resolving these issues. These issue topics were important for evaluating and disclosing impacts in the FEIS, and they remain the focus for the SEIS. The issues were addressed by the decision that selected FEIS Alternative G, and they have been resolved to the greatest possible degree on that basis. A detailed explanation of how these issues were resolved may be found in the ROD. These issues occur to a greater or lesser degree in various zones of the parks.

Visitor Use and Access. Different recreation user groups contend that the national parks offer either too much or not enough of various types of use. Many people contend that motorized use has greatly affected opportunities for nonmotorized use in the GYA. People who advocate for snowmobile use, including service and equipment providers in gateway communities, indicate that there is a right to personal (individual) access to the parks for this use, and that limiting the use would affect business.

Visitor Experience. Expectations for quality winter recreation experiences are different for different user groups. This raises contention between groups for which quiet and solitude, and clean air needs conflict with the impacts of snowmobiles, especially when facilities for these different groups are in close proximity to each other. At issue is the nature of visitor enjoyment and its relationship to park resources and values.

Human Health and Safety. Four primary health and safety issues were identified regarding winter visitor use. Motorized vehicular emissions and noise affect employees and visitors. Operating speeds and the frequency of motor vehicle accidents and fatalities, as well as the number of nighttime collisions involving wildlife, is of concern. Avalanche hazards exist in

some areas. There are safety problems where different modes of winter transport are co-located or are in close proximity.

Social and Economic Issues. Local businesses provide services to visitors near both parks, and many local economies rely, in part, on revenues from parks visitors in the winter. Concern was voiced in response to the draft EIS that eliminating oversnow travel and snowmobiles in particular or closing an entrance to a park during the winter could have a detrimental effect on local economies. More recent concerns have been voiced that there should be allowable growth in snowmobile use in the parks. Other commenters stated that concern for the parks' resources should be elevated above economics.

Natural Resources. Impacts of winter use on natural resources revolve around three major issues: the impact of groomed surfaces and their use on wildlife; the impact of snowmobile emissions on air quality and air quality related values; and the impact of noise from snowmobiles and snowcoaches on the natural soundscape. Many people articulate these concerns, but some others deny that there are any significant impacts on natural resources.

ALTERNATIVES

There are four alternatives for winter visitor use in the three park units evaluated in the SEIS. Two of the alternatives (alternatives 2 and 3) are limited specifically to actions that allow snowmobile recreation to continue in the parks. Alternative 1a was the selected alternative in the *Record of Decision for the Winter Use Plans and Final Environmental Impact Statement for Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway* (ROD) as modified by the final rule published in the *Federal Register* on January 22, 2001. This alternative serves as the no action alternative. Alternative 1b is the same as alternative 1a, but it defers implementation for one more year. The alternatives for the DSEIS were formulated in response to the concern that information on new snowmobile technologies and other connected issues was not included in the original FEIS. Consequently, Alternatives 2 and 3 were formulated specifically to provide an additional basis for the choice of snowmobiles as a mode of winter transportation in the parks. Table S-1 summarizes the features of all alternatives in the SEIS.

AFFECTED ENVIRONMENT

Given the scope of the SEIS, much of the affected environment has already been described in the FEIS. Therefore, large portions of the FEIS affected environment are incorporated by reference, suitably referenced in the SEIS. The emphasis for analysis is on those topics for

which there is new information, with enough other discussion for convenience of the reader and for continuity in explaining the effects analysis. Impact topics discussed in the SEIS are shown below.

SEIS IMPACT TOPICS	
TOPIC	FOCUS OF ADDITIONAL ANALYSIS
Socioeconomics	New economic information has been provided by the State of Wyoming. Some alternative provisions may allow a more refined analysis compared to the FEIS.
Air Quality and Public Health	Industry information about “cleaner and quieter” snowmobiles, and additional information about snowcoach emissions and sound, may alter analysis of effects. Effects of interim limits on snowmobile use vary by alternative on this topic.
Public Safety	Effects of interim limits on snowmobile use vary by alternative on this topic.
Wildlife: Bison and Elk	Some alternative provisions may allow a more refined analysis compared to the FEIS, showing differences between alternatives.
Natural Soundscapes	Industry information about “quieter” snowmobiles, and additional information about snowcoach sound, may alter analysis of effects. Also, effects of interim limits on snowmobile use will vary by alternative in regard to this topic.
Visitor Access	Effects of interim limits on snowmobile use vary by alternative on this topic.
Visitor Use	Effects of interim limits on snowmobile use vary by alternative on this topic.
Visitor Experience	Industry information about “cleaner and quieter” snowmobiles, and additional information about snowcoach emissions and sound, may alter analysis of effects. Effects of interim limits on snowmobile use vary by alternative on this topic.
Adjacent Lands	Industry information about available “cleaner and quieter” snowmobiles may alter analysis of effects. Also, effects of interim limits on snowmobile use will vary by alternative in regard to this topic.

EFFECTS OF THE ALTERNATIVES

The alternatives are intended to define the issues sharply and provide a clear basis of choice. Since this is a supplemental EIS, the alternatives in this document focus the issues sharply on whether or not there should be snowmobiles allowed in the three park units, and if they are allowed, under what circumstances. The existing condition in regard to impact topics addressed in the SEIS is presented in Chapter III. The direct, indirect and cumulative effects in regard to these topics are disclosed in Chapter IV of the SEIS. For each impact topic the methods and assumptions used in its analyses are presented, followed by the direct and indirect effects for each alternative. At the end of the chapter, cumulative effects are analyzed for each alternative, as are impacts on adjacent lands. Table S-2 quantifies, where possible, and summarizes the impacts of the alternatives in a comparative form. The existing condition for each topic is also presented for comparison under the title of FEIS Alternative A. Relative alternative impacts by topic are briefly presented below.

Natural Soundscape

Compared to the existing condition in which unregulated snowmobile use is occurring, alternatives 1a and 1b would improve the condition of the natural soundscape significantly.

Overall noise levels and areas in which motorized recreation vehicles are audible would be greatly reduced. In terms of quantified impacts, alternative 2 would have the greatest impact on the natural soundscape by a large margin over alternatives 1a and 1b. Separating out the effects due only to oversnow vehicle travel, under quiet conditions in the parks, where oversnow motorized vehicle noise is audible more than 50% of the time, alternative 2 would have about 20 times the impact of alternatives 1a and 1b, and alternative 3 would have about 10 times the impact.¹ Alternative 2 would increase impacts on the natural soundscape compared to the current condition, both in terms of overall sound levels, and areas of audibility. Alternative 3 would marginally decrease sound levels and marginally increase areas of audibility compared to the existing condition.

Air Quality

Compared to the existing condition in which unregulated snowmobile use is occurring, alternatives 1a and 1b would improve air quality in the parks more than the other alternatives. Alternative 3 would improve conditions the least. On the basis of total NAAQS pollutant emissions, alternatives 1a and 1b would produce about one-fourth the total emissions currently experienced. Alternative 2 would produce nearly three-fourths the total emissions that are currently generated, and alternative 3 would produce about a third of that amount.

Socioeconomics

Ranking economic impacts, alternatives 1a and 1b would have the greatest impact of those evaluated in the SEIS compared to the existing economic outputs in the three state region, the 5-county area, and on West Yellowstone, Montana. None of the three SEIS alternatives would have measurable impacts on the other GYA gateway communities. NPS asserts these impacts are short term. Compared to current output levels for each of the economic analysis areas, all of the SEIS alternatives produce less than a 1% decline in both jobs and dollars.

Wildlife

All alternatives would maintain the same amount of groomed motorized routes in important ungulate habitat within the parks. Therefore, effects associated with groomed routes – their potential influence on wildlife movements and distribution - would be the same in each. Effects associated with the use of groomed routes, including collisions, habitat displacement and behavioral changes, are directly related to the numbers and patterns of oversnow vehicle

¹ From data provided in the Draft SEIS, in the conclusion section for Effects on the Natural Soundscape.

use. Alternatives 1a and 1b feature oversnow motorized travel by mass transit snowcoach travel only, thus reducing traffic volumes, lowering average travel speed, and facilitating travel operations in a scheduled and controlled fashion. Therefore the effects of these alternatives on ungulates would be the lowest. Alternative 2 features the greatest number of vehicles (both snowmobiles and snowcoaches) operating in the least controlled fashion, consequently associated effects on ungulates would be the greatest. Alternative 3 also features snowmobiles and snowcoaches, therefore effects would be greater than alternatives 1a and 1b, but, due to fewer allowable snowmobiles, and the requirement that they be permitted in YNP only when accompanied by a guide, overall effects would be less than Alternative 2.

Health and Safety

For both employees and visitors, alternatives 1a and 1b would achieve the greatest improvement relative to the existing condition. The indices to this determination are numbers and types of vehicles and levels of NAAQS pollutant criteria emissions. The former is related to accident frequencies and conflicts. The latter is related to physical health parameters impacted by pollutants, particularly for those who are susceptible to respiratory difficulties. With the fewest numbers and types of vehicles operating at speeds and on schedules that minimize risk of incident, alternatives 1a and 1b would have the least impact. These alternatives also produce the lowest emission levels. In both respects alternative 2 would have the greatest impact. Alternative 3 would be ranked between the other alternatives. Both alternatives 2 and 3 retain a mix of snowcoach and snowmobile traffic (operating at different speeds and schedules), with increased risk of accidents and conflicts as in the current use environment.

Visitor Access

All alternatives are intended to retain motorized oversnow access to accommodate average annual levels of visitation to the three park units. In respect to the amount of access, and locations whereby access is obtained, there is no significant difference among the alternatives. Alternative 2 would increase the total amount of snowmobile use allowed in YNP, above average annual visitation, in the event use occurs at the daily limit each day. Alternative 3 limits daily snowmobile use to the average peak amount, except at YNPs West Entrance where the balance is provided via snowcoach. The chief difference among the alternatives is the mode of access and the allowable limits by entrance. These differences relate more to visitor experience than access.

Visitor Experience

Visitor experience is a function of many parameters. Comparisons of visitor experience must be made in the context of the existing condition, in which relatively unregulated snowmobile use occurs -- with the current generation of 2-stroke snowmobiles. In this situation, impacts on the natural soundscape, the viewing of wildlife, clean air, and other experiential factors are occurring. Under existing conditions, effects on visitors who prefer an essentially non-motorized experience are evident. This is a significant part of the purpose and need for action, which crosses into all other impact topics. Relative to the existing condition, alternatives 1a and 1b remedy impacts on these visitors the most. These alternatives represent an incentive to visit for other potential visitors who have been displaced in the past or who do not visit because of the existing condition. Relative to the existing condition, and these visitors, alternatives 2 and 3 improve conditions to the extent that snowmobiles are cleaner and quieter and fewer in number.

From the standpoint of those who enjoy snowmobiling, and through personal preference would not enjoy access by snowcoach, alternatives 1a and 1b would significantly impact their visitor experience. They could still enjoy park resources and values, but their enjoyment is based fundamentally on access by snowmobile. Both alternatives 2 and 3 preserve this mode of access. The limitation offered by alternative 2 to improve existing conditions relative to visitor experience is that, over time, snowmobiles coming into the park would need to be cleaner and quieter. Alternative 3 strikes a greater balance initially between motorized and non-motorized use, relative to desired experiences, by also providing for fewer motorized vehicles, and by controlling their use through NPS permitted guides. All alternatives contain adaptive management provisions intended to adjust management in accordance with resource and visitor experience needs.

Table S-1: Comparison of Alternative Features

	ALTERNATIVES 1a and 1b		ALTERNATIVE 2	ALTERNATIVE 3
Emissions	<ul style="list-style-type: none"> •Snowcoach travel only managed by concessions permit and required to meet the best available environmental standards, (currently the mattrack snowcoach) •Phase in these standards through the permitting process 		<ul style="list-style-type: none"> •Rental snowmobiles: 200 g/kW-hr (149g/hp-hr) for CO and 75 g/kW -hr (56g/hp-hr) for HC [proposed 2010 EPA emission rule for snowmobiles] beginning in 2002-2003 •Public snowmobiles: allow any 4 stroke and any 2-stroke using bio-fuels and lubes •By 2005-2006 all snowmobiles must meet 2010 standards 	<ul style="list-style-type: none"> •Cleaner and quieter technologies managed by NPS permit and managed adaptively. •Interim emission requirements are based on best available technology and evaluated annually as emissions are reduced numbers could be increased
Sound	<ul style="list-style-type: none"> • Snowcoaches: 75 decibels phasing to 70 decibels² 		<ul style="list-style-type: none"> • Rental snowmobiles: 75 decibels³ • Public snowmobiles: 78 decibels² • Snowcoaches: 75 decibels² 	<ul style="list-style-type: none"> •Interim sound emission requirements are based on best available technology and evaluated annually (as sound emissions are reduced numbers could be increased)
Interim Limits and Phase In Period	Alternative 1a <ul style="list-style-type: none"> •2001-2002 no change in YELL •2002-2003 close Jackson Lake and Teton Park Road to motorized vehicles •2002-2003 snowmobiles at a maximum of 50% of current average day at West and South Entrances- current use maintained at other areas. 2003-2004 snowcoach only travel, snowmobile access maintained to inholdings and USFS areas in GRTE 	Alternative 1b <ul style="list-style-type: none"> •2002-2003 no change in YELL •2002-2003 close Jackson Lake and Teton Park Road to motorized vehicles •2003-2004 snowmobiles at a maximum of 50% of current average day at West and South Entrances- current use maintained at other areas. 2004-2005 snowcoach only travel, snowmobile access maintained to inholdings and USFS areas in GRTE 	<ul style="list-style-type: none"> • Interim limit for monitoring and adaptive management program. As monitoring and carrying capacity studies indicate, use numbers may be adjusted. •North Entrance limited to 100 per day •West Entrance limited to 900 in year 1 •West Entrance limited to 700 in year 2 •West Entrance limited to 500 in year 3 •East Entrance limited to 200 per day •South Entrance limited to 500 per day •Continental Divide ST 150 per day •Grassy Lake Road- no limit •Snowcoach travel no limit 	<ul style="list-style-type: none"> •Interim limit for 1st year of monitoring and adaptive management program. As monitoring and carrying capacity studies indicate use numbers may be adjusted. •North Entrance limited to 100 per day •West Entrance limited to 330 per day •East Entrance limited to 100 per day •South Entrance limited to 400 per day •Continental Divide ST 100 per day •Grassy Lake- limited to 100 per day •Snowcoach travel no limit

² Snowcoach sound measured at 50 ft on the A-weighted scale at 35-40 mph

³ Snowmobile sound measured at 50 ft on the A-weighted scale at 40 mph

Table S-1: Comparison of Alternative Features

	ALTERNATIVES 1a and 1b	ALTERNATIVE 2	ALTERNATIVE 3
Access	<ul style="list-style-type: none"> •All oversnow routes open to snowcoaches •Snowmachine access eliminated on the Teton Park Road and on the frozen surface of Jackson Lake •Levels of snowcoach access would be unrestricted •In 2009, the road from Colter Bay to Flagg Ranch becomes an oversnow route •Increase both the size and number of warming huts 	<ul style="list-style-type: none"> •All oversnow routes open except snowmachine access eliminated on the Teton Park Road and fishermen only the frozen surface of Jackson Lake •Levels of access are restricted to the average peak day numbers for the West Entrance and higher than peak day average for East, South and North Entrances. •Snowcoach numbers unrestricted •Increase groomed non-motorized trails •Increase both the size and number of warming huts 	<ul style="list-style-type: none"> •All major oversnow routes open except snowmachine access is eliminated on the Teton Park Road and on the frozen surface of Jackson Lake •Levels of access are restricted to slightly less than average daily totals for West Entrance, average peak day numbers for South, East and North Entrances •Access by snowmobile is allowable only with an NPS permitted guide •Snowcoach numbers unrestricted •In 2009, the road from Colter Bay to Flagg Ranch becomes an oversnow route •Increase groomed non-motorized trails •Increase both the size and number of warming huts
Wildlife	<ul style="list-style-type: none"> •Non-motorized uses in wildlife winter ranges and thermal areas to travel on designated routes or trails •Construct wildlife -proof garbage facilities •Manage adaptively-continue scientific studies and monitoring regarding winter visitor use and park resources. Close selected areas of the parks if scientific studies indicate that human presence or activities have a detrimental effect that could otherwise not be mitigated 	<ul style="list-style-type: none"> •Non-motorized uses in wildlife winter ranges and thermal areas to travel on designated routes or trails •Construct wildlife -proof garbage facilities •Employ additional law enforcement •Manage adaptively 	<ul style="list-style-type: none"> •Manage adaptively- action items include signing , employing additional enforcement rangers, limiting access •Non-motorized uses in wildlife winter ranges and thermal areas to travel on designated routes or trails •Construct wildlife -proof garbage facilities
Winter Season	<ul style="list-style-type: none"> •Late November to mid-March 	<ul style="list-style-type: none"> •Mid-November to mid-December access only by rubber-tracked snowcoaches, snowshoes or skis •Mid-December to mid-March snowmobile and snowcoach travel 	<ul style="list-style-type: none"> •Late November to mid-March •Last week of February (after President's Day) to mid-March access by snowcoach, skis or snowshoes only
Interpretation and Orientation	<ul style="list-style-type: none"> •Information program on snow and trail conditions , points of interest and available recreation opportunities •Increase interpretive opportunities on the unique aspects of the winter environment. Provide interpretive programs at destination areas and at warming huts. 	<ul style="list-style-type: none"> •Information program on snow and trail conditions , points of interest and available recreation opportunities •Increase interpretive opportunities on the unique aspects of the winter environment. Provide interpretive programs at destination areas and at warming huts. •Develop educational video on trail etiquette, snowmobile safety, and proper behavior around wildlife 	<ul style="list-style-type: none"> •Information program on snow and trail conditions , points of interest and available recreation opportunities •Increase interpretive opportunities on the unique aspects of the winter environment. Provide interpretive programs at destination areas and at warming huts. •Develop educational video on trail etiquette, snowmobile safety, and proper behavior around wildlife

Table S-2: Summary of Effects

	FEIS Alternative A (Existing Condition)	SEIS Alternatives 1a and 1b	SEIS Alternative 2	SEIS Alternative 3
Natural Soundscape	<p>Audibility, considering all vehicles, wheeled and oversnow⁴: Audible, but less than 10% of the time, on 200,700 ac. Audible more than 10% of the time on 107,400 ac. Audible more than 50% of the time on 26,500 ac.</p> <p>Average Noise Level⁵: Exceeds 50dB at 100ft along 9 segments, or 144 miles of groomed road. Exceeds 10 dB over 4000 feet distant on 11 road segments. Is highest due to oversnow use from W. Entrance to Old Faithful (56 dB) and on Jackson Lake (58 dB - snowmobiles & snowplanes).</p>	<p>Audibility, all vehicles: Audible less than 10% of the time on 199,100 ac. (-0%). Audible more than 10% of the time on 95,060 ac. (-53%). Audible more than 50% of the time on 14,090 ac. (-47%). Audibility, oversnow vehicles only: Less than 10% of the time on 175,220 ac. More than 10% of the time on 78,140 ac. More than 50% of the time on 2,260 ac.</p> <p>Average Noise Level: Does not exceed 50 dB at 100 ft on any road segment. Exceeds 10 dB over 4000 feet distant on 7 segments. Is highest due to oversnow use from W. Entrance to Old Faithful at 49 dB. Noise on Jackson Lake is eliminated.</p>	<p>Audibility, all vehicles: Audible less than 10% of the time on 182,500 ac. (-9%). Audible more than 10% of the time on 124,800 acres (+16 %). Audible more than 50% of the time on 53,090 acres (+100%). Audibility, oversnow vehicles only: Less than 10% of the time on 158,700 ac. More than 10% of the time on 107,850 ac. More than 50% of the time on 41,260 ac.</p> <p>Average Noise Level: Exceeds 50 dB at 100ft along 12 segments, or 172 miles of groomed road. Exceeds 10 dB over 4000 feet distant on 13 road segments. Is highest due to oversnow use from W. Entrance to Old Faithful at 55-56 dB, and West Thumb to Flagg Ranch at 55 dB. Jackson Lake is at 46 dB for fishing access</p>	<p>Audibility, all vehicles: Audible less than 10% of the time on 175,700 ac. (-12%). Audible more than 10% of the time on 115,000 ac. (+7%). Audible more than 50% of the time on 36,270 acres (+37%). Audibility, oversnow vehicles only: Less than 10% of the time on 151,860 ac. More than 10% of the time on 98,110 ac. More than 50% of the time on 24,440 ac.</p> <p>Average Noise Level: Exceeds 50 dB at 100ft along 8 segments, or 134 miles of groomed road. Exceeds 10 dB over 4000 feet distant on 11 road segments. Is highest due to oversnow use from W. Entrance to Old Faithful at 54-55 dB and West Thumb to Flagg Ranch at 54 dB. Noise on Jackson Lake is eliminated.</p>
Air Quality	<p>Parkwide Total Emissions (tons per year): CO=1,538 tpy, PM₁₀=11 tpy, NOx=19 tpy HC=476 tpy</p> <p>West Yellowstone: Maximum 1-hour CO is 32.2 ppm (MT std is 23 ppm); 98% contributed by snowmobiles. Maximum 24-hour PM₁₀ is 68.2 µgrams/m³ (MT std is 150), 99% contributed by snowmobiles.</p> <p>West Entrance to Madison Maximum 1-hour CO is 14.8 ppm (MT std is 23 ppm); 98.6% contributed by snowmobiles. Maximum 24-hour PM₁₀ is 33.7 µgrams/m³ (MT std is 150), 97.6% contributed by snowmobiles.</p> <p>Flagg Ranch Maximum 1-hour CO is 4.72 ppm; 72% contributed by snowmobiles. Maximum 24-hour PM₁₀ Ranch is 6.0 µgrams/m³), 99.3% contributed by snowmobiles.</p>	<p>Parkwide Total Emissions (tons/vr): After full implementation, CO=479, PM₁₀=1.0, NOx=19.0, HC=63</p> <p>West Yellowstone: Maximum 1-hour CO is 4.5 ppm (-86%) Maximum 24-hour PM₁₀ is 23.4 µgrams/m³ (-66%)</p> <p>W. Entrance to Madison Maximum 1-hour CO is 1.15 ppm (-92%). Maximum 24-hour PM₁₀ is 5.4 µgrams/m³ (-84%)</p> <p>Flagg Ranch Maximum 1-hour CO is 2.0 ppm (-58%) Maximum 24-hour PM₁₀ is 5.17 µgrams/m³ (-14%)</p>	<p>Parkwide Total Emissions(tons/vr): After full implementation in 2004-05, CO=1411, PM₁₀=10, NOx=39, HC=428</p> <p>West Yellowstone: Maximum 1-hour CO is 7.9 ppm (-75%). Maximum 24-hour PM₁₀ is 31.2 µgrams/m³ (-54%)</p> <p>W. Entrance to Madison Maximum 1-hour CO is 2.4 ppm (-84%). Maximum 24-hour PM₁₀ is 5.4 µgrams/m³ (-84%)</p> <p>Flagg Ranch Maximum 1-hour CO is 1.55 ppm (-67%) Maximum 24-hour PM₁₀ is 5.46 µgrams/m³ (-9%)</p>	<p>Parkwide Total Emissions (tons/vr): After full implementation 2003-04, CO=694, PM₁₀=1.0, NOx=84, HC=80</p> <p>West Yellowstone: Maximum 1-hour CO is 5.8 ppm (-82%). Maximum 24-hour PM₁₀ is 24.6 µgrams/m³ (-64%)</p> <p>West Entrance to Madison Maximum 1-hour CO is 1.45 ppm (-90%). Maximum 24-hour PM₁₀ is 5.4 µgrams/m³ (-84%)</p> <p>Flagg Ranch Maximum 1-hour CO is 0.77 ppm (-84%) Maximum 24-hour PM₁₀ is 5.04 µgrams/m³ (-16%)</p>

⁴ Audibility numbers reported from the SEIS effects analysis, using quiet background conditions. The analysis also reports audibility considering average background conditions.
⁵ Sound levels reported from the SEIS effects analysis, using quiet background conditions. The analysis also reports sound levels considering average background conditions.

Table S-2: Summary of Effects

	FEIS Alternative A (Existing Condition)	SEIS Alternatives 1a and 1b	SEIS Alternative 2	SEIS Alternative 3
Visibility	<p>Staging and Destination Areas Emissions cause local, perceptible visibility impairment near YNP W. Entrance, in and around the Old Faithful area, and at Flagg Ranch.</p> <p>Oversnow Routes There is perceptible visibility impairment along heavily used roadway segments under certain viewing conditions.</p>	<p>Staging & Destination Areas Emissions would not cause local, perceptible visibility impairment near YNP W. Entrance, Old Faithful, or Flagg Ranch.</p> <p>Oversnow Routes Emissions would not cause perceptible visibility impairment along roadways. (These conditions are from the FEIS for alternative G)</p>	<p>Staging & Destination Areas Analysis not completed by DSEIS publication date</p> <p>Oversnow Routes Analysis not completed by DSEIS publication date</p>	<p>Staging & Destination Areas Analysis not completed by DSEIS publication date</p> <p>Oversnow Routes Analysis not completed by DSEIS publication date</p>
Socioeconomic Effects	<p>Economic Indices: 1996 total economic output in MT and WY, ID: \$109.5 billion and total employment of 1.5 million jobs. 1996 total economic output in the 5-county GYA area: \$5.7 billion and 97,000 jobs. Gateway communities of Gardiner MT, West Yellowstone MT, Cody WY, Jackson WY: Status quo short term.</p> <p>Social Indices: 67% of survey respondents agree that there should be motorized winter access to YNP. 61% of respondents also are concerned about the disturbance to wildlife in the winter. Current winter visitors are those who are attracted by available opportunities, which at present are dominated by snowmobiling. Visitors who expect quiet nonmotorized experiences have been displaced from the parks, or their expectations are not met. The existing winter access policy is not preferred by the public in the region or the nation.</p>	<p>Economic Impacts: 3 state region: -\$18.4 million (<-1%) and -471 jobs (<-1%) 5-county GYA area: -\$21.1 million (<-1%) and -499 jobs (<-1%). W. Yellowstone: winter economy down 33% short term, year round economy would decline by 8% short term (less than the annual growth). No measurable economic impact on other gateway communities.</p> <p>Social Impacts: Motorized oversnow access is provided in all areas. Mode of access is changed to snowcoach. A majority of local residents agree that snowmobiles adversely impact the parks and should be limited. Loss of opportunities to snowmobile may shift participation rates to other winter activities, offsetting economic losses. A majority of regional and national respondents favor snowcoach access over snowmobile. This alternative would likely be favored in a regional or national forum..</p>	<p>Economic Impacts: 3 state region: maximum loss of \$6.5 million (<-1%) and 159 jobs (<-1%). 5-county GYA area: maximum loss of \$5.8 mill. (<-1%) and 136 jobs (<-1%) West Yellowstone: winter economy would decline by a maximum of 9% short term, year round economy would decline by < 8% short term..No measurable economic impact on other gateway communities.</p> <p>Social Impacts: Motorized oversnow access is provided in all areas. Mode of access is a mix of snowmobile and snowcoach. A majority of local residents agree that snowmobiles adversely impact the parks and should be limited. A minor decrease in opportunities to snowmobile from W. Yellowstone may shift participation to other gateways. Replacement behaviors not likely. A majority of regional and national respondents favor snowcoach access over snowmobile. This alternative would likely not be favored in a regional or national forum.</p>	<p>Economic Impacts: 3 state region: maximum loss of \$12.3 million (<-1%) and 299 jobs (<-1%). 5-county GYA area: maximum loss of \$11.1 ml. (<-1%) and 262 jobs (<-1%) West Yellowstone: winter economy would decline by a maximum of 17.6% short term, year round economy would decline by < 8% short term..No measurable economic impact on other gateway communities.</p> <p>Social Impacts: Motorized oversnow access is provided in all areas. Mode of access is a mix of snowmobile and snowcoach. A majority of local residents agree that snowmobiles adversely impact the parks and should be limited. A minor decrease in opportunities to snowmobile from W. Yellowstone may shift participation to other gateways. Replacement behaviors not likely. A majority of regional and national respondents favor snowcoach access over snowmobile. This alternative would likely not be favored in a regional or national forum.</p>

Table S-2: Summary of Effects

	FEIS Alternative A (Existing Condition)	SEIS Alternatives 1a and 1b	SEIS Alternative 2	SEIS Alternative 3
WILDLIFE	<p>Ungulates Effects of groomed surfaces on animal movements and population dynamics – unknown to what extent any beneficial effects outweigh negative effects. Displacement effects — minor to moderate, adverse, and short-term. Risk of collisions with snowmobiles — negligible, adverse, and short-term.</p>	<p>Ungulates Fewer groomed surfaces in GTNP and JDR, therefore related effects less than in A. Same as A for YNP. Displacement effects < than A due to mass transit; fewer vehicles using groomed surfaces. Risk of collision with snowmobiles < than A due to prohibition on snowmobiles.</p>	<p>Ungulates Groomed surfaces — same as A. Displacement effects — same as A. Risk of collisions with snowmobiles – same as A; effects may be mitigated by slower speed limits and the prohibition on nighttime travel from 8 p.m. to 7:30 a.m. (8:30 a.m. at the W. Entrance).</p>	<p>Ungulates Groomed surfaces — same as A. Displacement effects — same as A; effects are mitigated by requiring snowmobilers be accompanied by NPS permitted guides. Risk of collisions with snowmobiles – same as A; effects may be mitigated by the prohibition on nighttime travel from 8 p.m. to 7:30 a.m. (8:30 a.m. at the W. Entrance).</p>
Health and Safety	<p>Safety Adverse, minor effects to visitor and employee safety from the W. Entrance to Old Faithful and on the CDST. Adverse, negligible effects on less heavily traveled routes. Adverse, minor to moderate effects on visitors who use the East Entrance.</p> <p>Health Where high levels of NAAQS pollutants occur, employees and visitors who are susceptible to respiratory problems would likely be affected. High levels occur at times and places where large numbers of oversnow vehicles stage for entry into the parks.</p>	<p>Safety Beneficial, major and long term effects due to the elimination of snowmobiles.</p> <p>Health High levels of NAAQS pollutants are not likely to occur. Employees and visitors who are susceptible to respiratory problems would likely not be affected.</p>	<p>Safety Same as current condition but effects may be mitigated by the prohibition on travel from 8:00 P.M to 7:30 A.M. (8:30 A.M. through the W. Entrance), and reduced speed limits.</p> <p>Health Where high levels of NAAQS pollutants occur, employees and visitors who are susceptible to respiratory problems would likely be affected, though to a lesser degree than in Alternative A, existing condition. High levels are likely to occur at times and places where large numbers of oversnow vehicles stage for entry into the parks. Though machines produce lower levels of pollutants, greater numbers of machines could offset the gain, relative to A.</p>	<p>Safety Adverse, negligible to minor effects from the W. Entrance to Old Faithful. Adverse, negligible effects on the CDST from Colter Bay to Flagg Ranch due to the elimination of the shared corridor. Other effects same as current condition but effects may be mitigated by the prohibition on travel from 8:00 P.M to 7:30 A.M. (8:30 A.M. through W. Entrance) and mandatory use of guides.</p> <p>Health Where high levels of NAAQS pollutants occur, employees and visitors who are susceptible to respiratory problems would likely be affected, though to a lesser degree than in Alternative A or Alternative 2.</p>
Visitor Access	<p>Existing access and use defines the baseline condition for park visitation. Access is defined by travel corridors by which visitors arrive in the Greater Yellowstone Area, the gateways they use to enter the parks, the mode of transport used to enter and travel about the parks, and the levels of visitation that occur, on the average, by gateway.</p>	<p>These alternatives would provide access by oversnow motorized means through existing gateways at historic visitation levels. The mode of access would change from a mix of snowcoach and snowmobile to snowcoach only.</p>	<p>oversnow motorized means through existing gateways. The mode of access would remain a mix of snowcoach and snowmobile. Historic use levels by snowmobile access at all gateways would be preserved. Capped use at West Yellowstone would allow current average use on a daily basis - current peak use would not be allowed. Other gateways would allow increased use by snowmobile.</p>	<p>oversnow motorized means through existing gateways. The mode of access would remain a mix of snowcoach and snowmobile. Historic use levels by snowmobile access at gateways would be preserved except for that at West Yellowstone. Increased snowcoach access would be available at West Yellowstone to provide for historic visitation levels.</p>

Table S-2: Summary of Effects

	FEIS Alternative A (Existing Condition)	SEIS Alternatives 1a and 1b	SEIS Alternative 2	SEIS Alternative 3
Visitor Experience	<p>All three park units</p> <ul style="list-style-type: none"> • Little or no operational change would occur. Visitation would be influenced by the method of transportation available to visitors. • For visitors who prefer to visit the parks via snowmobile, the visitor experience would continue to be highly satisfactory. • Encounters with park wildlife and scenery would continue to be primary attractions, consequently the overall satisfaction of current winter visitors would remain high. • Current levels of snowmobile emissions and sound levels would continue to detract from critical characteristics of the desired winter experience for many visitors resulting in direct short-term major adverse impacts on their visitor experience. • The perceived unsafe behavior of others and the occurrence of visitor conflicts would continue to have direct short-term minor to moderate adverse effects on the experience of some users. • Current motorized use would continue to deter some user groups from visiting or returning to the parks. 	<p>Effects on All Three Park Units</p> <ul style="list-style-type: none"> • Adaptive management provisions for long term protection of park resources may result in area closures, resulting in local direct adverse impacts on visitor experience. • The reduction in emissions and sound under this alternative would result in direct major beneficial improvements to the experiences of park visitors. • Opportunities to appreciate clean air would be greatly improved. Where oversnow motorized use occurs, via snowcoach, quiet and clean air would be facilitated by improved motorized technology. • Opportunities to view wildlife and scenery would be the same as in A. • Major beneficial changes relating to safety by eliminating the possibility of snowmobile related motor vehicle accidents. Elimination of snowmobiles would result in major adverse impacts to the experiences of visitors in this user group. <p>Effects on Grand Teton/Parkway</p> <ul style="list-style-type: none"> • Negligible to minor adverse impacts on visitor experience relating to wildlife and scenery viewing due to the elimination of motorized travel on the frozen surface of Jackson Lake. • Opportunities to view wildlife would be improved for nonmotorized users of these areas. • Major beneficial changes relating to safety by eliminating snowmobile-related motor vehicle accidents, and wheeled-vehicle accidents from Colter Bay to Flagg Ranch. • Major adverse impact for those who wish to ride snowmobiles or snowplanes. 	<p>Effects on All Three Park Units</p> <ul style="list-style-type: none"> • Adaptive management provisions for long term protection of park resources may result in area closures, resulting in local direct adverse impacts on visitor experience. • Opportunities to appreciate clean air would be increased from alternative A providing a minor to moderate beneficial effect. Where oversnow motorized use occurs and clean air would be facilitated by improved motorized technology. • Due to the numbers of snowmobiles allowed in the parks on a daily basis, there would be a decline from current condition (FEIS alternative A) relative to opportunities for quiet and solitude. <p>Effects on Yellowstone</p> <ul style="list-style-type: none"> • Snowmobile users would experience little change in opportunities to view wildlife and scenery from FEIS alternative A. However, the quality of those experiences would be moderately and adversely affected for some visitors, particularly on peak use days. • There would be few changes in the effects relating to safety from alternative A. <p>Effects on Grand Teton/Parkway</p> <ul style="list-style-type: none"> • Negligible to minor adverse impacts on visitor experience relating to wildlife and scenery viewing would occur because of the elimination of motorized travel on the frozen surface of Jackson Lake. Fisherman however would not be affected. • Moderate improvements to safety by eliminating the possibility of snowmobile-related motor vehicle accidents, and wheeled-vehicle accidents on the road segment from Moran Junction to Flagg Ranch. 	<p>Effects on All Three Park Units</p> <ul style="list-style-type: none"> • Adaptive management provisions: same effects as shown in other alternatives. • Snowmobile users would experience little change in opportunities to view wildlife and scenery from alternative A as described in the FEIS. There would be moderate and beneficial improvements in the quality of those experiences for some visitors. • Opportunities to appreciate clean air, quiet and solitude would be increased from FEIS alternative A and decreased when compared to SEIS alternatives 1 and 2. Where oversnow motorized use occurs quiet and clean air would be facilitated by improved motorized technology and fewer vehicles. <p>Effects on Yellowstone</p> <ul style="list-style-type: none"> • The use limit of 330 snowmobiles entering from the West would result in moderate to major adverse effects on approximately 300 snowmobile enthusiasts (per day) who find entering from the West Entrance essential to their park experience. • The use limit of 330 would result in moderate to major improvements to the groomed surface on that road segment. • Moderate improvements to safety because of the emphasis on guided tours and snowcoaches under this alternative. <p>Effects on Grand Teton/Parkway</p> <ul style="list-style-type: none"> • Negligible to minor adverse impacts on visitor experience relating to wildlife and scenery viewing would occur because of the elimination of motorized travel on the frozen surface of Jackson Lake. • Moderate adverse effects relating to safety by continuing the possibility of snowmobile-related motor vehicle accidents, and wheeled-vehicle accidents on the road segment from Moran Junction to Flagg Ranch.

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CHAPTER I

PURPOSE AND NEED FOR ACTION

INTRODUCTION

In 1990, a Winter Use Plan was completed for Yellowstone National Park (YNP), Grand Teton National Park (GTNP), and the John D. Rockefeller, Jr., Memorial Parkway (the Parkway). In 1994, the National Park Service (NPS) and US Forest Service (USFS) began work on a coordinated interagency report on Winter Visitor Use Management. This effort was in response to an earlier than expected increase in winter use. The 1990 Winter Use Plan projected 143,000 visitors for the year 2000. Winter visitors to YNP and GTNP in 1992-1993 exceeded this estimate. Total visitors to YNP and GTNP in that year were, respectively, 142,744 and 128,159.

In 1994 the Greater Yellowstone Coordinating Committee (GYCC), composed of National Park Superintendents and National Forest Supervisors within the Greater Yellowstone Area (GYA; Figure 1), recognized the trend toward increasing winter use and identified concerns relating to that use. The GYCC chartered an interagency study team to collect information relative to these concerns and perform an analysis of winter use in the GYA. The analysis, *Winter Visitor Use Management: a Multi-agency Assessment* was drafted in 1997 and approved by the GYCC for final publication in 1999. The assessment identifies desired conditions for the GYA, current areas of conflict, issues and concerns, and possible ways to address them. The final document considered and incorporated many comments from the public, interest groups, and local and state governments surrounding public lands in the GYA.

In May 1997, the Fund for Animals, et al., filed suit against the National Park Service (NPS). The suit alleged that the NPS had failed to conduct adequate analysis under the National Environmental Policy Act (NEPA) when developing its winter use plan for the parks, failed to consult with the US Fish and Wildlife Service on the effects of winter use on threatened and endangered species, and failed to evaluate the effects of trail grooming on wildlife and other park resources. In October 1997, the Department of the Interior (DOI) and the plaintiffs reached a settlement agreement. The NPS agreed, in part, to prepare an

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environmental impact statement (EIS) for new winter use plans for the parks and the Parkway. This settlement provision was satisfied with publication and distribution of the final EIS (FEIS) on October 10, 2000. A record of decision (ROD) was signed by Intermountain Regional Director Karen Wade on November 22, 2000 and subsequently distributed to interested and affected parties. The ROD selected FEIS alternative G, which eliminates both snowmobile and snowplane use from the parks by the winter of 2003-2004, and provides access via an NPS-managed, mass-transit snowcoach system. The decision was based on a finding that existing snowmobile and snowplane use impairs park resources and values, thus violating the statutory mandate of the NPS.

Implementing aspects of this decision relating to designation of routes available for oversnow motorized access required a rule change for each park unit in question. Following publication of a proposed rule and the subsequent public comment period, a final rule was published in the Federal Register on January 22, 2001. After additional review, the rule became effective on April 22, 2001. Full implementation of the plan and the rule changes do not occur until the winter of 2003-2004.

On December 6, 2000 the Secretary of the Interior, et al., were named as defendants in a lawsuit brought by the International Snowmobile Manufacturers' Association (ISMA), et al. The State of Wyoming intervened on behalf of the plaintiff. The lawsuit asked for the decision, as reflected in the ROD and final Rule, to be set aside. Its allegations include the NPS' failure to give legally mandated consideration to all of the alternatives, making political decisions outside the public process and contradictory to evidence and data, failure to give the public appropriate notice and participation, failure to adequately consider and use the proposals and expertise of the cooperating agencies, failure to properly interpret and implement the parks' purpose, discrimination against disabled visitors, and improper adoption of implementing regulations.¹ A settlement was achieved June 29, 2001 and, through its terms, NPS is acting as lead agency to prepare this Supplemental Environmental Impact Statement (SEIS). By the settlement, the State of Wyoming will act as a cooperating agency. In accordance with the settlement, the SEIS will incorporate new or additional information and data as provided by the affected public and cooperating agencies, including information regarding new snowmobile technologies, submitted with respect to a winter use plan for the parks.

¹ These allegations are expressed in Section B of the settlement agreement. In Section C of the agreement, NPS denies all allegations.

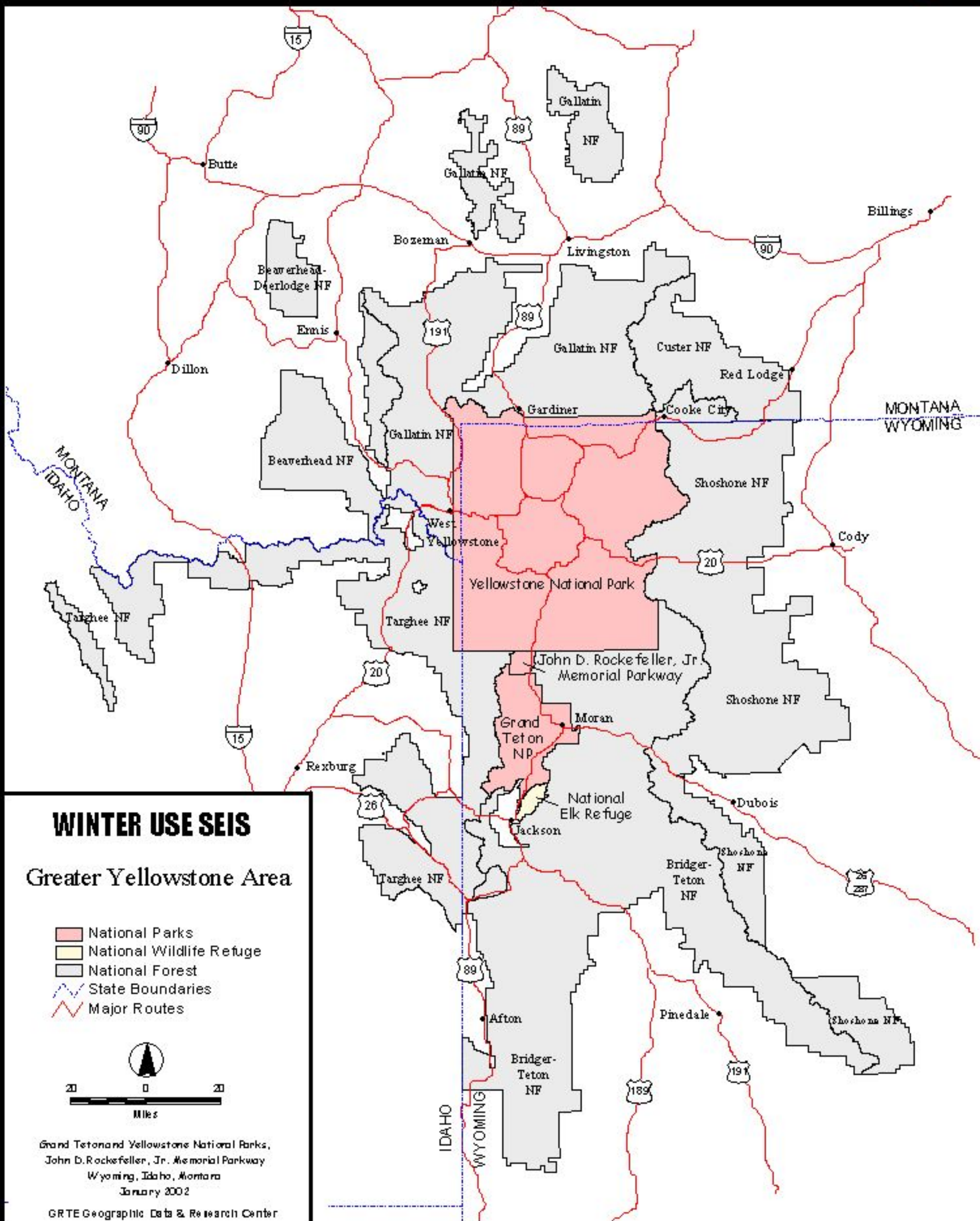


Figure 1

A Notice of Intent to prepare a Supplemental EIS was published in the *Federal Register* on July 27, 2001 (66 FR 39197).

Subsequent to the settlement, all agencies (other than the State of Wyoming) that signed cooperating agency agreements during the earlier EIS process agreed to be cooperating agencies for the Supplemental EIS. These agencies are: the US Forest Service, the States of Montana and Idaho, Fremont County in Idaho, Gallatin and Park Counties in Montana, and Park and Teton Counties in Wyoming. In addition, the Environmental Protection Agency (EPA) was requested by NPS to be a new cooperating agency in this effort, and EPA agreed.

THE PURPOSE OF THE SUPPLEMENTAL EIS (SEIS)

The purpose for preparing a Supplemental EIS, as agreed to in the settlement and as published in the Federal Register Notice of Intent, is as follows. The preparation of a supplemental EIS is deemed necessary to further the purposes of the National Environmental Policy Act (NEPA) which includes: 1) soliciting more public comment on the earlier decision and alternatives to it; 2) consideration of additional information from the International Snowmobile Manufacturers' Association; and 3) consideration of other significant and relevant new or updated information not available at the time of the earlier decision. As provided in the NEPA regulations, both a draft and a final SEIS are to be prepared. The fundamental purpose and need for action in the supplemental analysis remains the same as in the FEIS. The SEIS focuses on three alternatives to the existing decision, so far as oversnow motorized use is concerned, considering again a number of features evaluated in the FEIS, and developing additional information as it applies to these alternatives. The "no action" alternative that represents a baseline for comparison in the SEIS is the current decision allowing for motorized oversnow access via snowcoach only, beginning the winter of 2003-2004. The supplemental analysis takes full advantage of "tiering"² and "incorporation by reference,"³ two mechanisms provided in NEPA regulations to aid in producing efficient documents. Appropriate references to the FEIS and summaries of information are provided in the SEIS. The FEIS is reasonably available for public review because it remains on the Internet at www.winteruseplanning.net, over 500 copies were

² 40 CFR 1502.20 and 1508.28(b): Tiering from an EIS to a supplemental allows the lead agency to focus on the issues that are ripe for decision, and exclude from consideration items already decided or not yet ripe.

³ 40 CFR 1502.21: Agencies shall incorporate material into an EIS by reference when the effect will be to cut down on bulk without impeding agency and public review.

distributed since October 2000, and a number of copies of the document are on hand for distribution.

NATIONAL PARK SERVICE MANDATES

The management of the national park system and NPS programs is guided by the Constitution, public laws, treaties, proclamations, Executive Orders, regulations, and directives of the Secretary of the Interior and the Assistant Secretary for Fish and Wildlife and Parks. NPS policy must be consistent with these higher authorities, and with appropriate delegations of authority. In order of this hierarchy, pertinent guidance is summarized below.

THE ORGANIC ACT

The NPS and its basic mandate are authorized under the NPS Organic Act (16 USC 1, 2-4) and the General Authorities Act (16 USC 1a-1 through 1a-8):

“The Service thus established shall promote and regulate the use of the Federal areas known as National Parks...by such means and measures as to conform to the fundamental purposes of the said Parks...which purpose is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.”

The direction provided by the Organic Act was the subject of many comments on the Draft Environmental Impact Statement (DEIS). The FEIS discusses comments pursuant to the Act on page 3.

THE GENERAL AUTHORITIES ACT

The General Authorities Act, as amended by the Redwood Act (March 27, 1978, P.L. 95-250, 92 Stat. 163, 16 U.S.C. 1a-1) affirms the basic tenets of the Organic Act and provides additional guidance on national park system management:

“The authorization of activities shall be construed, and the protection, management and administration of these areas shall be conducted in light of the high public value and integrity of the National Park system and shall not be exercised in derogation of the values and purposes for which these various areas have been established....”

The restatement of these principles of park management in the Redwood Act is intended to serve as the basis for any judicial resolution of competing private and public values and interests in the National Park System (Senate Report No. 95-528 on S. 1976 pg.7). The Senate committee report stated that under the Redwood amendment:

“The Secretary of the Interior has an absolute duty, which is not to be compromised, to fulfill the mandate of the 1916 Act to take whatever actions and seek whatever relief as will safeguard the units of the national park system.”

Consideration of these principles gives rise to the concept of “impairment” discussed on page 3 of the FEIS, and below under 2001 Management Policies.

Park-Specific Legislation

The Yellowstone National Park Act (16 USC 21, *et seq.*), the Grand Teton National Park Act (16 USC 406d-1 *et seq.*), and the John D. Rockefeller, Jr., Memorial Parkway Act (P.L. 92-404) provide authority and direction for management of each park addressed in this SEIS. The establishment legislation is included in Appendix C of the FEIS.

OTHER LAWS

Because one of the primary issues about snowmobile use is that of air quality, The Clean Air Act (as amended, P.L. Chapter 360, 69 Stat. 322, 42 U.S.C. 7401 *et seq.*) is a primary focus in both the FEIS and in this SEIS. Other pertinent laws are listed on page 3 of the FEIS.

Clean Air Act (CAA)

This act provides both for the prevention of significant deterioration of areas where air is cleaner than national ambient air quality standards (NAAQS), and for an affirmative responsibility by the Federal Land Manager⁴ to protect air quality related values, including visibility. The Prevention of Significant Deterioration (PSD) provisions of the CAA are intended, among other things, to preserve, protect, and enhance the air quality in national parks. The legislative history of the PSD provisions⁵ indicates that federal land managers are to "assume an aggressive role in protecting the air quality values of land areas under his jurisdiction" and to "err on the side of protecting the air quality-related values for future generations." The Act also requires the prevention of any future impairment and the remedying of any existing impairment in Class I federal areas, which includes Yellowstone and Grand Teton National Parks. Additionally, the JDRMP (A class II area) abuts Class I federal areas including the two national parks and the Jedediah Smith and Teton wilderness areas.

EXECUTIVE ORDERS

Executive Orders provide additional direction that must be considered as part of the purpose and need for action. Executive Order (EO) 11644, Use of Off-Road Vehicles on the Public Lands, issued by President Nixon in 1972, states in part:

⁴ The Federal Land Manager, in this case the NPS, has an affirmative responsibility to protect these resources – which is a separate issue from air quality vis-à-vis NAAQS standards.

⁵ S.Rep 95-127(95th cong., 1st Sess) 1977

“The widespread use of such vehicles on the public lands — often for legitimate purposes but also in frequent conflict with wise land and resource management practices, environmental values, and other types of recreational activity — has demonstrated the need for a unified federal policy...that will ensure that the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of these lands, to promote the safety of all users of those lands, and to minimize conflicts among the various users of those lands.” Further, “[a]reas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats” and “areas and trails shall be located to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands...” Additionally, “Areas and trails shall be located in areas of the National Park system...only if the respective agency head determines that off-road vehicle use in such locations will not adversely affect their natural, aesthetic, or scenic values.” Finally, “The respective agency head shall monitor the effects of the use of off-road vehicles on lands under their jurisdictions. On the basis of the information gathered, they shall from time to time amend or rescind designation of areas or other actions taken pursuant to this order as necessary to further the policy of this order.”

This order is amended by EO11989, issued by President Carter in 1978, which adds:

“... the respective agency head shall, whenever he determines that the use of off-road vehicles will cause or is causing considerable adverse effects on the soil, vegetation, wildlife, wildlife habitat or cultural or historic resources of particular areas or trails of the public lands, immediately close such areas or trails to the type of off-road vehicle causing such effects, until such time as he determines that such adverse effects have been eliminated and that measures have been implemented to prevent future recurrence.”

The order defines off-road vehicles as “...any motorized vehicle that is capable of cross-country travel over ...snow, ice, or other natural terrain.” The order excludes vehicles used for official administrative travel, vehicles used for emergency purposes, or any vehicle that is expressly authorized for such travel. Oversnow motorized vehicles have been authorized to travel in the two national parks, but only on surfaces where motorized vehicles have been authorized to travel at other times of the year.

The executive orders clearly provide direction for the use of oversnow motorized vehicles operating on roads, and state that a determination about their impacts must be made. The impacts were evaluated and disclosed in the FEIS, resulting in a determination of impairment and the decision to implement a “snowcoach only” alternative, alternative G from the FEIS (see ROD pages 1 and 18). Appendix C in the FEIS includes the full text of the executive orders described above. Other pertinent executive orders are listed on page 4 of the FEIS.

REGULATIONS

General provisions in park service regulations address snowmobile use (36 CFR 2.18).

Snowmobiling is generally prohibited except on designated routes and water surfaces

available for motorized use at other times. In addition, snowmobiles are prohibited except where designated and

“only when their use is consistent with the park’s natural, cultural, scenic and aesthetic values, safety considerations, park management objectives, and will not disturb wildlife or damage park resources” (36 CFR 2.18c).

Section (d) of this regulation lists additional limitations and prohibitions that apply where snowmobiles are allowed, including noise limits, speed limits, operator requirements, and machine appurtenances. Section (d) authority is the basis for listing many of the possible tools available for implementing the alternatives (see Chapter II, Implementation Measures) that do not require further analysis in this SEIS.

NPS MANAGEMENT POLICIES

Current policy guidance for NPS is published in Management Policies 2001(December 2000. On the Internet at <http://www.nps.gov/policy/mp/policies.html>). The policies interpret the laws, regulations and executive orders, governing management of National Park System areas. Policies most applicable to this SEIS and the existing decision are summarized or abstracted here because they were not final before the publication of the FEIS. The subsequent Record of Decision fully considered the policies and made a finding that park resources and values are impaired by snowmobile use. The numbers below refer to the portions of the Management Policies 2001 that are the sources for the text.

1.4.3 The NPS Obligation to Conserve and Provide for Enjoyment of Park Resources and Values

“The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with the mandate to conserve park resources and values. This mandate is independent of the separate prohibition on impairment, and so applies all the time, with respect to all park resources and values, even when there is no risk that any park resources or values may be impaired. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give the Service the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, so long as the impact does not constitute impairment of the affected resources and values.”

“The fundamental purpose of all parks also includes providing for the enjoyment of park resources and values by the people of the United States. The “enjoyment” that is contemplated by the statute is broad; it is the enjoyment of all the people of the United States, not just those who visit parks, and so includes enjoyment both by people who directly experience parks and by those who appreciate them from afar. It also includes deriving benefit (including scientific knowledge) and inspiration from parks, as well as other forms of enjoyment. Congress, recognizing that the enjoyment by future generations of the national parks can be ensured only if the superb quality of park resources and values is left unimpaired, has provided that when there is a conflict between conserving resources and values and providing for enjoyment of them, conservation is to be predominant. This is how courts have consistently interpreted the Organic Act, in decisions that variously describe it as making 'resource protection the primary goal' or 'resource protection the overarching concern,' or as

establishing a 'primary mission of resource conservation,' a 'conservation mandate,' 'an overriding preservation mandate,' 'an overarching goal of resource protection.' Or 'but a single purpose, namely, conservation.'”

1.4.4 The Prohibition on Impairment of Park Resources and Values

“While Congress has given the Service the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement (enforceable by the federal courts) that the Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. This, the cornerstone of the Organic Act, establishes the primary responsibility of the National Park Service. It ensures that park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them.”

The impairment of park resource and values may not be allowed by the Service unless directly and specifically provided for by legislation or by the proclamation establishing the park. The relevant legislation or proclamation must provide explicitly (not by implication or inference) for the activity, in terms that keep the Service from having the authority to manage the activity so as to avoid impairment.”

1.4.5 What Constitutes Impairment of Park Resources and Values

"The impairment that is prohibited by the Organic Act and the General Authorities Act is an impact that, in the professional judgement of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts.”

An impact to any park resource or value may constitute an impairment. An impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- Identified as a goal in the park's general management plan or other relevant NPS planning documents.

An impact would be less likely to constitute an impairment to the extent that is an unavoidable result, which cannot reasonably be further mitigated, of an action necessary to preserve or restore the integrity of park resources or values. Impairment may occur from visitor activities; NPS activities in the course of managing a park; or activities undertaken by concessioners, contractors, and others operating in the park.

1.4.6 What Constitutes Park Resources and Values

“The park resources and values that are subject to the nonimpairment standard include: ♦ The park’s scenery, natural and historic objects, and wildlife, and the processes and conditions that sustain them, including to the extent present in the park: the ecological, biological, and physical processes that created the park and continue to act upon it; scenic features; natural visibility, both in daytime and at night; natural landscapes; natural soundscapes and smells, water and air resources; soils; geological resources; paleontological resources; archeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites, structures, and objects; museum collections; , and native plants and animals;

- Opportunities to experience enjoyment of the above resources, to the extent that can be done without impairing any of them;
- The park's role in contributing to the national dignity, the high public value and integrity and the superlative environmental quality of the national park system, and the benefit and inspiration provided to the American people by the national park system; and
- Any additional attributes encompassed by the specific values and purposes for which it was established."

1.4.7 Decision-making Requirements to Avoid Impairments

"Before approving a proposed action that could lead to an impairment of park resources and values, an NPS decision-maker must consider the impacts of the proposed action and determine, in writing, that the activity will not lead to an impairment of park resources and values. If there would be an impairment, the action may not be approved.

In making a determination of whether there would be an impairment, a National Park Service decision-maker must use his or her professional judgement. The decision-maker must consider any environmental assessments or environmental impact statements required by the National Environmental Policy Act of 1969 (NEPA); relevant scientific studies, and other sources of information; and public comments.

When an NPS decision-maker becomes aware that an ongoing activity might have led or might be leading to an impairment of park resources and values, he or she must investigate and if there is, or will be, an impairment. Whenever practicable, such an investigation and determination will be made as part of an appropriate park planning process undertaken for other purposes. If it is determined that there is, or will be, such an impairment, the Director must take appropriate action, to the extent possible within the Service's authorities and available resources, to eliminate the impairment. The action must eliminate the impairment as soon as reasonably possible, taking into consideration the nature, duration, magnitude, and other characteristics of the impacts to park resources and values, as well as the requirements of NEPA, the Administrative Procedure Act, and other applicable law."

4.7.1 Air Quality

"The National Park Service has a responsibility to protect air quality under both the 1916 Organic Act and the Clean Air Act (CAA). Accordingly, the Service will seek to perpetuate the best possible air quality in the parks to (1) preserve natural resources and systems; (2) preserve cultural resources; and (3) sustain visitor enjoyment, human health, and scenic vistas. Vegetation, visibility, water quality, wildlife, historic and prehistoric structures and objects, cultural landscapes, and most other elements of a park environment are sensitive to air pollution and are referred to as 'air quality-related values.' The Service will assume an aggressive role in promoting and pursuing measures to protect these values from the adverse impacts of air pollution. In cases of doubt as to the impacts of existing or potential air pollution on park resources, the Service will err on the side of protecting air quality and related values for future generations."

"Superintendents will take actions consistent with their affirmative responsibilities under the CAA to protect air quality-related values in Class I areas. Class I areas are national parks over 6,000 acres and national wilderness areas over 5,000 acres that were in existence on August 7, 1977. The CAA establishes a national goal of preventing any future, and remedying any existing, human-made visibility impairment in Class I areas."

"Although the CAA gives the highest level of air quality protection to Class I areas, it provides many opportunities for the Service to participate in the development of pollution control programs to preserve, protect, and enhance the air quality of all units of the National Park System. Regardless of Class I designation, the Service will take advantage of these opportunities."

4.9 Soundscape Management

"The National Park Service will preserve, to the greatest extent possible, the natural soundscapes of parks. Natural soundscapes exist in the absence of human-caused sound. The natural soundscape is the aggregate of all the natural sounds that occur in parks, together with the physical capacity for

transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive, and can be transmitted through air, water, or solid materials. Some natural sounds in the natural soundscape are also part of the biological or to the physical resource components of the park. Examples of such natural sounds include: ...sounds produced by physical processes, such as wind in the trees, claps of thunder, or falling water. The Service will restore degraded soundscapes to the natural condition wherever possible, and will protect natural soundscapes from degradation due to noise (undesirable human-caused sound)."

"Using appropriate management planning, superintendents will identify what levels of human-caused sound can be accepted within the management purposes of parks. The frequencies, magnitudes, and duration of human-caused sound considered acceptable will vary throughout the park, being generally greater in developed areas and generally lesser in undeveloped areas. In and adjacent to parks, the Service will monitor human activities that generate noise that adversely affects park soundscapes, including noise caused by mechanical or electronic devices."

"The service will take action to prevent or minimize all noise that, through frequency, magnitude, or duration, adversely affects the natural soundscape or other park resources or values, or that exceeds levels that have been identified as being acceptable to, or appropriate for, visitor uses at the sites being monitored."

8.2 Visitor Use

"Enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks. The Service is committed to providing appropriate, high quality opportunities for visitors to enjoy the parks, and will maintain within the parks an atmosphere that is open, inviting, and accessible to every segment of American society. However, many forms of recreation enjoyed by the public do not require a national park setting and are more appropriate to other venues. The Service will therefore:

- Provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the superlative natural and cultural resources found in the parks.
- Defer to local, state, and other federal agencies; private industry; and non-governmental organizations to meet the broader spectrum of recreational needs and demands.

"To provide for enjoyment of the parks, the National Park Service will encourage visitor activities that:

- Are appropriate to the purposes for which the park was established;
- Are inspirational, educational, or healthful and otherwise appropriate to the park environment;
- Will foster an understanding of, and appreciation for, park resources and values, or will promote enjoyment through a direct association with, interaction with, or relation to park resources; and
- Can be sustained without causing unacceptable impacts to park resources or values."

"The Service will allow other visitor uses that do not meet all the above criteria if they are appropriate to the purpose for which the park was established and they can be sustained without causing unacceptable impacts to park resources or values. Unless mandated by statute, the Service will not allow visitors to conduct activities that;

- Would impair park resources or values;
- Create an unsafe or unhealthful environment for other visitors or employees;
- Are contrary to the purposes for which the park was established, or
- Unreasonably interfere with: the atmosphere of peace and tranquility, or the natural soundscape maintained in wilderness and natural, historic or commemorative locations within the park; NPS interpretive, visitor service, administrative or other activities; NPS

concessioner or contractor operations or services or other existing, appropriate park uses.”

“Management controls must be imposed on all park uses to ensure that park resources and values are preserved and protected for the future. If and when a superintendent has a reasonable basis for believing that an ongoing or proposed public use would cause unacceptable impacts to park resources or values, the superintendent must make adjustments to the way the activity is conducted, so as to eliminate the unacceptable impacts. If necessary, the superintendent may (1) temporarily or permanently close a specific area; (2) prohibit a particular use; or (3) otherwise place limitations on the use to ensure that impairment does not occur.”

8.2.3 Use of Motorized Equipment

“The variety of motorized equipment -- including visitor vehicles, concessioner equipment, and Park Service administrative or staff vehicles and equipment -- that operates in national parks has the potential to adversely impact park resources, including the park’s natural soundscape. In addition to their natural values, natural sounds, such as waves breaking on the shore, the roar of a river, and the call of a loon, form a valued part of the visitor experience. Conversely, the sounds of motor vehicle traffic, an electric generator, or loud music can greatly diminish the solemnity of a visit to a national memorial, the effectiveness of a park interpretive program, or the ability of a visitor to hear a bird singing its territorial song.”

“The Service will strive to preserve or restore the natural quiet and natural sounds associated with the physical and biological resources of parks. To do this, superintendents will carefully evaluate and manage how, when, and where motorized equipment is used by all those--including park staff--who operate equipment in the parks. Uses and impacts associated with the use of motorized equipment will be addressed in park planning processes. Where such use is necessary and appropriate, the least impacting equipment, vehicles, and transportation systems should be used, consistent with public and employee safety. The natural ambient sound level--that is, the environment of sound that exists in the absence of human-caused noise--is the baseline condition, and the standard against which current conditions in a soundscape will be measured and evaluated.”

8.2.3.1 Off-road Vehicle Use

“Off-road motor vehicle use in national park units is governed by Executive Order 11644 (as amended by Executive Order 11989), which defines off-road vehicles as 'any motorized vehicle designed for or capable of cross-country travel on or immediately over, land, water, sand, snow, ice, marsh, swampland, or other natural terrain' (except any registered motorboat or any vehicle used for emergency purposes). Unless otherwise provided by statute, any time there is a proposal to allow a motor vehicle meeting this description to be used in a park, the provisions of the Executive order must be applied.”

“Within the national park system, routes and areas may be designated for off-road motor vehicle use only by special regulation, and only when it would be consistent with the purposes for which the park unit was established. Routes and areas may be designated only in locations in which there will be no adverse impacts on the area's natural, cultural, scenic, and esthetic values, and in consideration of other visitor uses. The criteria listed in section 8.2 [set out above] must also be applied to determine whether off-road vehicle use may be allowed. As required by the Executive order and the Organic Act, superintendents must immediately close a designated off-road vehicle route whenever the use is causing, or will cause, unacceptable adverse effects on the soil, vegetation, wildlife, wildlife habitat, or cultural or historic resources.”

8.2.3.2 Snowmobiles

“Snowmobile use is a form of off-road vehicle use governed by Executive Order 11644 as amended by Executive Order 11989) and, in Alaska, by provisions of ANILCA (16 USC 3121 and 3170). Implementing regulations are published at 36 CFR 2.18, 36 CFR Park 13, and 43 CFR Part 36.”

“NPS administrative use of snowmobiles will be limited to what is necessary to manage public use of snowmobile routes and areas; to conduct emergency operations; and to accomplish essential maintenance, construction, and resource protection activities that cannot be accomplished reasonably by other means.”

1997 COURT SETTLEMENT

Considerations embodied in the legal mandates discussed here prompted The Fund for Animals, et al., to sue the NPS in 1997. Specifically, the suit pointed out the alleged failure of the NPS to: consult with USFWS on impacts of winter use on threatened or endangered species; prepare an EIS concerning winter use; and evaluate the effects of trail grooming on wildlife and other park resources. The suit was resolved by a settlement agreement approved by the court in October 1997. The agreement committed the NPS to: write an EIS and determine a new winter use plan for the three park units; consult with USFWS; and evaluate the possible closure of a road segment in Yellowstone.

2001 COURT SETTLEMENT

The International Snowmobile Manufacturers’ Association et al., filed suit against the Secretary of the Interior, et al., in December 2000. The suit alleges that NPS violated the Administrative Procedures Act, the National Environmental Policy Act, the National Park Service Organic Act, and other laws. The State of Wyoming intervened in behalf of ISMA, and the Greater Yellowstone Coalition, et al., intervened in behalf of the Department of the Interior and NPS. While denying the allegations, Interior and NPS agreed in the settlement that a Supplemental EIS considering new information and circumstances will further the purposes of NEPA.

The settlement notes that preparing an SEIS will provide the affected public and cooperating agencies the opportunity to provide new information related to the impacts of winter use in the parks and additional opportunity to provide comments on winter use management of the parks. Accordingly, the NPS has prepared an SEIS considering “new information and data submitted regarding new snowmobile technologies, which will include, but is not limited to, exhaust and noise emissions and engine design and type.” The park service is required to issue a Record of Decision and promulgate final regulations, if applicable, on or before November 15, 2002. Concurrent with the settlement agreement, NPS and the State of Wyoming negotiated another agreement under which the state would participate in the SEIS process as a cooperating agency.

PURPOSE AND NEED FOR ACTION

The purpose and need for action as the basis for this SEIS, in accordance with CEQ regulations (40 CFR 1502.13), is the same as that for the previous FEIS. The purpose and need is described on FEIS pages 6-8. Some of the information in the FEIS purpose and need section was responsive to comments received on the draft EIS. The reader is encouraged to review this material. The fundamental purpose and need for action is framed by a set of desired conditions, compared to existing conditions⁶. The desired conditions are distilled from the large body of laws, regulations, executive orders, and policies that are summarized above. Alternatives are different ways of addressing existing conditions and moving toward the desired state. FEIS alternative G was selected in the current decision as the best approach to meet the purpose and need for action.

DESIRED CONDITION

These bulleted statements express desired conditions or objectives for winter use management, tying directly to laws, regulations, executive orders and policies:

- Visitors have a range of appropriate winter recreation opportunities from primitive to developed. Winter recreation complements the unique characteristics of each landscape within the ecosystem.
- Recreational experiences are offered in an appropriate setting; they do not take place where they will irreparably impact air quality, wildlife, cultural areas, the experiences of other park visitors, or other park values and resources.
- High quality facilities are provided in parks to support the need for safety and enhanced visitor experiences.
- Conflicts among user groups are minimal.
- Visitors know how to participate safely in winter use activities without damaging resources.
- Oversnow vehicle sound and emission levels are reduced to protect employee and public health and safety, enhance visitor experience, and protect natural resources.

EXISTING CONDITION

The following issues and concerns contrast with the desired condition expressed above.

These issues were addressed in the current decision to phase out snowmobiles.

⁶ Contention exists as to whether or not the existing condition should be that which is presented in the FEIS, prior to the decision allowing motorized access using snowcoaches only (FEIS alternative G). The State of Wyoming believes that alternative G in the FEIS (alternative 1a in this SEIS) should represent the existing condition. In a literal sense, an alternative does not describe existing condition; it is set of management actions intended to remedy the gap between existing and desired conditions. Also, because alternative G has not yet been implemented, and because current winter use remains the same as described in the FEIS, it is appropriate to describe the existing conditions as they are at present. The FEIS and SEIS alternatives are intended to address these needs, for example by proposing cleaner and quieter snowmobiles to address issues of pollution and noise.

- **Visitor Access:** Access to most locations is limited to those who can afford to ride a snowcoach or snowmobile. Access for personal motorized use via snowmobile has increased greatly since the beginnings of the winter program in the three parks. Snowmobile use, in current numbers, is in conflict with use of the parks' facilities by other user groups.
- **Visitor Experience:** A variety of winter use conflicts have been identified involving the relationship between users and among different user groups, which affect how people experience the parks. At destination facilities and trails open to both motorized and nonmotorized users, nonmotorized users express dissatisfaction with the sound, odor, and quantity of snowmobiles. These vehicles affect the solitude, quiet, and clean air and other resource values that many people expect and wish to enjoy in national parks.
- **Visitor Safety:** The current level of snowmobile accidents, unsafe users, inherent winter risks, and conflicts between users are of concern from the standpoint of public safety.
- **Resources:** Parks have documented health hazards from snowmachine emissions, harassment and unintended impacts on wildlife from groomed trails and their use, degradation of air quality-related values, and impacts on the natural soundscape. Many people strongly object to the degradation of inherent parks' values, as well as how these impacts affect people and their recreational opportunities.

SCOPE OF ANALYSIS — RANGE OF ALTERNATIVES CONSIDERED

The scope of analysis determines the range of alternatives to be considered. Pages 7-8 in the FEIS describe the scope of analysis resulting in the seven alternatives evaluated in that document. The analysis in this SEIS is further limited to two alternatives that would allow snowmobile recreation to continue in the parks on the basis of improved snowmobile technology or other measures that address the adverse impacts of snowmobile use disclosed in the FEIS. Because the settlement agreement is fundamentally predicated on "furthering the purposes of NEPA", and considering new information about snowmobile technology that was unavailable at the time of the FEIS and ROD, only those alternative elements having to do with motorized use need be evaluated. In content, this is strongly related to the rule that implements the decision that designates the winter routes available for oversnow or off-road vehicle use (see policy section, above). For purposes of clarity, those elements of the decision that are not being reevaluated are duplicated in the following section of this chapter. Those elements of the current decision and rule, which are being reevaluated as a function of the new information about snowmobile technology, represent alternative 1a, no action, in this SEIS. Alternative 1b is the same in all respects to alternative 1a as far as final implementation is concerned, but it would set implementation back and allow another year for phase-in. The basis for alternatives 2 and 3 describes how designations for oversnow motorized use could change to allow different levels and locations of snowmobile use. In the previous Draft EIS and Final EIS, recreational use considerations and supporting facilities

were limited to those considered technically possible at the time, or feasible for development and implementation. Alternatives evaluated in the Draft EIS that proposed implementation of “clean and quiet” standards were criticized during the public comment period as impractical because technology was unavailable or because NPS was alleged to have no authority to impose such measures⁷. Now, because of the settlement agreement, the SEIS specifically evaluates technological improvements in snowmobile technology as to how they may change impacts on park resources and values, such as air quality, the natural soundscape, and visitor experience. Because interim use limits are imposed as features of the SEIS alternatives, social and economic impacts are also reevaluated.

The decision to be made based on the analysis in this document must consider the conclusions in the FEIS regarding adverse impacts and the finding in the Record of Decision and final rule that these impacts (individually and collectively) constitute impairment of park resources and values.⁸

The reader should note that NPS-12, which provides current direction on the preparation of environmental documents, requires an assessment of impairment for each resource impact topic. Therefore, the scope of the analysis incorporates the need to eliminate or successfully mitigate, in some fashion, impacts in addition to emissions and noise – most notably impacts on wildlife and visitor experience.

WINTER USE PLAN ELEMENTS NOT REEVALUATED IN THIS SEIS

As explained in the previous section, the scope of analysis is limited to alternative features dealing with motorized use (new snowmobile and snowcoach technology) and resource impacts that are associated with that use as conveyed in the SEIS alternatives. There are a number of

⁷ To clarify: this statement is intended to illustrate a point which appears to remain not well understood. The analysis and the alternatives in the SEIS are not vastly different than those in the FEIS. What appears to have changed is the public's perception regarding new technology, or its willingness to consider its use, and industry's willingness and ability to produce it. Also, based on public comment, it appears the snowmobiling public acknowledges NPS' authority to impose these kind of restrictions, which was not the case in the response to alternatives in the DEIS.

⁸ This is a matter of record. The SEIS is a supplement to the FEIS per the settlement, and the context in which it is being written is the acceptance of new data, not a conclusion that the FEIS and ROD are incorrect as alleged in the ISMA litigation.

features of the winter use plan currently in place, pursuant to the record of decision (ROD) of November 22, 2000. These features do not require reanalysis. For purposes of clarity, the features are duplicated here. They apply to winter use in the 3 park units in addition to the alternatives for motorized oversnow access being considered in this SEIS. The actions are categorized in the ROD as *Actions and Assumptions Common to All [three] Units*, *Actions Specific to Yellowstone*, and *Actions Specific to Grand Teton and the Parkway*. For actions common to all units, the actions are further categorized as “implementation”, “regulations/enforcement/administration”, “resource protection”, and “visitor use and access”. References to “zones” incorporates additional explanation from tables and maps published in the FEIS. Provisions in the decision relating to mitigation and monitoring are also included. These measures are also shown as actions and assumptions common to all SEIS alternatives in Chapter II.

Actions and Assumptions Common to All Units

Implementation

- Unless otherwise noted, the parks will implement all actions the winter following the Record of Decision (ROD) for the winter use plans and EIS. Actions requiring a change in regulations will be implemented when the new regulations are effective.
- If it can be demonstrated sufficiently for NPS to determine that an implemented action has affected or would substantially affect a concession⁹ operation prior to the expiration of its contract, the action will be implemented only through negotiation or when a new contract is awarded.

Regulation/Enforcement/Administration

- Several actions include possible road closures depending on the results of scientific studies. None of the actions preclude other closures for safety, resource protection, or other reasons as identified in 36 CFR 1.5 or 2.18.
- At present no Environmental Protection Agency (EPA) standards exist for off-road vehicles. If the EPA adopts more stringent standards or measurement methods for vehicle emissions and sound applicable to winter use in the parks, they will be implemented in accordance with EPA regulations.
- Require all new oversnow vehicles purchased by the parks to conform to the best environmental standards available, and that other vehicles are retrofitted whenever possible with new technologies designed to lower sound and emission levels.

Resource Protection

- Continue scientific studies and monitoring regarding winter visitor use and park resources. Close selected areas of the park, including sections of roads, to visitor use if scientific studies indicate that human presence or activities have a detrimental effect on wildlife or other park resources that could not otherwise be mitigated. The appropriate level of environmental assessment under NEPA will be completed for all actions as required by CEQ regulations (40 CFR parts 1500-1508).

⁹ Required concession or a concession that is under contract at the time of this decision.

- Give a 1-year notice before any closure is implemented unless immediate closure is deemed necessary to avoid impairment of park resources.
- Sand, or an equally environmentally neutral substance, will be used for traction on all plowed winter roads. No salts will be used. Before spring opening, sand removal operations will continue on all plowed park roads.
- Investigate and implement options to reduce the palatability and accessibility to wildlife of the hydraulic fluid used in snow groomers.
- When snow depth warrants and at periodic intervals, routine plowing operations will include laying back roadside snowbanks that could be a barrier to wildlife exiting the road corridor.

Visitor Use and Access

- NPS will determine visitor use capacities based on studies that set indicators and standards for desired visitor experiences and resource conditions. The NPS will monitor indicators to maintain the conditions for each management prescription. If necessary, techniques such as reservations, permits, and differential fees will be implemented. See zone descriptions, monitoring table, and Appendix H (Recreation Carrying Capacity) in the FEIS.
- Continue to implement transition and action plans for accessibility and support the philosophy of universal access to the parks. The NPS will make reasonable efforts to ensure accessibility of buildings, facilities, programs, and services. The NPS will develop strategies to ensure that new and renovated facilities, programs and services (including those provided by concessionaires) are designed, constructed, or offered in conformance with applicable policies, rules, regulations, and standards (including but not limited to the Architectural Barriers Act of 1968; the Americans with Disabilities Act of 1990 (ADA)); the Uniform Federal Accessibility Standards of 1984 (UFAS); and the Guidelines for Outdoor Developed Areas of 1999).
- Architectural and Site Access and Programmatic Access: The NPS will evaluate existing buildings and existing and new programs, activities, and services (including telecommunications and media) to determine current accessibility and usability by disabled winter visitors. Action plans to remove barriers will be developed.
- This alternative includes an affirmative commitment to implement strategies designed to provide a reasonable level of affordable access to winter park visitors.
- Backcountry nonmotorized use will continue to be allowed throughout the parks except where designated otherwise (shown as Zone 8 or area of designated trail use on alternative map in the FEIS).
- Implement an information program on snow and trail conditions, points of interest, and available recreational opportunities. Through partnerships, establish park visitor contact opportunities in gateway communities and utilize state tourism program resources.

ACTIONS SPECIFIC TO YELLOWSTONE NATIONAL PARK

- In Yellowstone, the NPS will continue to plow Highway 191 and the road from Mammoth to Tower and Tower to the Northeast Entrance (Cooke City) throughout the winter.
- A designated route for *nonmotorized recreation* is defined as a marked or otherwise indicated oversnow travel way.
- Grand Canyon of the Yellowstone and the McMinn Bench bighorn sheep area will continue to be closed to winter use.
- Winter garbage storage facilities that are wildlife-proof will be constructed in the Old Faithful, Grant, Lake, and Canyon areas.

- Provide nonmotorized opportunities (e.g., skiing and snowshoeing) (zones 8 and 9). Examples of existing roads or trails that will be groomed include Fountain Flats Road and portions of the East Entrance road.
- Where feasible, set parallel tracks on one or both sides of the snow roads to facilitate nonmotorized access.
- Increase interpretive opportunities related to the unique aspects of the winter environment by providing interpretive programs at destination areas and warming huts. Provide guided interpretive programs for organized groups on snowcoaches. Provide interpretive ski and snowshoe tours and programs such as near Tower, Canyon, Mammoth, Old Faithful, West Thumb, Madison, and West Entrance.
- Restrict nonmotorized uses in wildlife winter ranges and thermal areas to travel on designated routes or trails (zones 8 and 9 in the FEIS).

ACTIONS SPECIFIC TO GRAND TETON NATIONAL PARK AND THE PARKWAY

In Grand Teton and the Parkway, the following roadways will continue to be plowed:

- Highway 26/89/287 from the south boundary of the park to Moran
- Highway 89/287 from Moran to Colter Bay
- Highway 26/287 from Moran to the eastern park boundary
- Teton Park Road from Moose Junction to Taggart Lake Trailhead, and from Jackson Lake Junction to Signal Mountain Lodge; from Highway 89/287 along the Pacific Creek road to the park boundary; from Kelly to the eastern park boundary; from Gros Ventre Junction to Kelly to Mailbox Corner; and the road to the eastern park boundary at Ditch Creek.
- Current winter closures will remain in effect on the Snake River floodplain, the Buffalo Fork River floodplain, the Uhl Hill area, Willow Flats, Kelly Hill, and Static Peak.
- Reasonable and direct access to adjacent public and private lands, or to privately owned lands within the park with permitted or historical motorized access, will continue via paved and plowed routes or via oversnow routes from GTNP (used by snowmobiles).
- Provide opportunities for nonmotorized ungroomed winter trail use (zone 9):
 - On the Teton Park Road from Taggart Lake Trailhead to Signal Mountain.
 - On Antelope Flats.
 - Near Colter Bay and Two Ocean Lake.
 - On the unplowed portion of the Moose-Wilson road.
- Continue destination and support facilities at Moose, Triangle X, Colter Bay, and Flagg Ranch, and add warming hut facilities along the Teton Park Road to provide visitor services and interpretive opportunities that focus on nonmotorized uses (zone 1).
- Limit backcountry nonmotorized use to designated routes to address wildlife issues in certain wildlife winter ranges, or close certain areas to all use.
- Increase interpretive opportunities related to the unique aspects of the winter environment by providing interpretive programs at destination areas and warming huts. Provide guided interpretive programs for organized groups on snowcoaches. Provide interpretive ski and snowshoe tours and programs at locations such as Moose, Colter Bay, and Flagg Ranch visitor services.
- Phase in administrative snowmobile types that meet the best available emission and sound limits. Administrative use of snowmobiles in Grand Teton is limited to law enforcement, utility and maintenance access, and search and rescue or other use as approved by the superintendent. Converting this use to snowcoaches will limit the ability of park employees to respond effectively to emergencies in these areas.
- Use of snowplanes on Jackson Lake will be discontinued following the 2001-2002 winter season.

DEFINITIONS

- Oversnow motor vehicles: self-propelled vehicles intended for travel on snow, driven by a track or tracks in contact with the snow that may be steered by skis or tracks in contact with the snow. This term includes both snowmobiles and snowcoaches.
- Snowmobiles: self-propelled vehicles intended for travel on snow, having a curb weight of not more than 1,000 pounds (450kg), driven by a track or tracks in contact with the snow, which may be steered by a ski or skis in contact with the snow.
- Snowplanes: self-propelled vehicles intended for oversnow travel, having a weight of not more than 1,000 pounds (450kg) mounted on skis in contact with the snow, and driven by a pusher-propeller.
- Snowcoaches: self-propelled, mass transit vehicles intended for travel on snow, having a curb weight of over 1,000 pounds (450kg), driven by a track or tracks and steered by skis or tracks, having a capacity of at least 8 passengers.
- The phrase “gateway communities” refers to the towns of Jackson and Cody, Wyoming, and Gardiner and West Yellowstone, Montana only.

MITIGATION

Air Quality

- Park concessions will be required to mitigate the impacts of air pollution during the interim period by selling only bio-fuels and synthetic lubes inside the park.

Water Resources

- Best management practices will be used during the construction, reconstruction, or winter plowing of trails and roads to prevent unnecessary vegetation removal, erosion, and sedimentation.
- Separate new or reconstructed winter-motorized trails from drainages where practicable to mitigate the routing of snowpack contaminants into surface water.
- Any new or reconstructed winter use sanitary facilities will be constructed in locations and with advanced technologies that will protect water resources.
- A focused monitoring program will reduce the uncertainty of impacts from oversnow vehicles, and if necessary indicate best management practices that might be implemented.

Wildlife, Including Federally Protected Species and Species of Special Concern

- NPS personnel will patrol sensitive resources to ensure compliance with area closures.
- Monitoring of eagle populations to identify and protect nests will continue. The park will continue to support the objectives of the Greater Yellowstone Bald Eagle Management Plan.
- Monitoring of wolf populations will continue.
- Lynx surveys will be undertaken to document the distribution and abundance of lynx in the parks and their relationship to packed surfaces. The presence of other carnivores will be documented. The parks will abide by the recommendations of the Lynx Conservation Assessment Strategy.

- Continue to assess grizzly bear abundance, distribution, and habitat selection, including the location of dens. The information obtained will assist park managers in protecting important habitats and planning recreational activities that minimize disturbance to bears. Monitoring grizzly bear populations will continue in accordance with the Interagency Grizzly Bear Management Guidelines and the parks' bear management plans.
- Monitoring and protecting trumpeter swan habitats and nests will continue, including the closure of nest sites, when warranted, to public access from February 1 to September 15.
- Monitoring potential or known winter use conflicts will result in area closures if necessary to protect wildlife habitat.
- Conduct snow track surveys for carnivores (including lynx) on both groomed and ungroomed routes.
- Continue to monitor use of groomed, ungroomed, and plowed surfaces by bison and other ungulates.

Cultural Resources

- Should the discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony occur during construction, provisions outlined in the Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001) will be followed.
- Trails and trailheads will be sited to avoid adversely impacting known cultural resources, including potential cultural landscapes. In addition, the use of natural materials and colors for all permanent signs erected will allow the signs to blend into their surroundings.

MONITORING

- In order to assess the long-term effects of management actions on park resources and values resource inventory, monitoring and adaptive management are incorporated into this decision. The key resources and values potentially impacted by winter recreation use in the three park units are air quality, wildlife, sound, water resources, safety, and visitor experience. Attachment A (in the ROD) outlines specific indicators for monitoring these resources and values. These indicators will be monitored to ensure protection of natural resources and park values and evaluate management success.
- The [decision] also includes adaptive management provisions. It provides for systematic feedback for park management and allows for adjustment of activities to mitigate unplanned or desirable outcomes. Procedures, indicators, standards and potential management actions for adaptive management are also presented in Attachment A (of the ROD).
- Actions affecting park values for which there are no defined standards, such as odor or visitor satisfaction are subject to an adaptive management approach. If continuing problems are indicated relative to such impacts, but there are insufficient funds for focused monitoring and evaluation of those problems, emergency management actions will be implemented to eliminate the impact pending the attainment of funds.

DECISION TO BE MADE

The “no action” alternative in this SEIS is represented by the decision currently in place and documented by a record of decision published in November of 2000, and the final rule published on January 22, 2001. The settlement agreement represents direction to engage in a

process to reconsider this decision based on the submittal of new information on snowmobile technology by ISMA and additional public comment. The decision lies within the scope of analysis presented above. Therefore, the decision to be made is whether to affirm the previous decision or to make a new one. The ISMA settlement agreement requires NPS to sign a new record of decision, to be published by November 15, 2002. That ROD will present the selected alternative and the rationale for its selection.¹⁰ The nature of the decision to be made remains essentially the same as described in the FEIS on pages 8-9. That is, which alternative best meets the purpose and need for action – addressing issues and resolving them to meet guidance in laws, regulations, executive orders and policies. If a new or revised decision is made, it can use elements or features, including mitigation, of any alternative already evaluated in the FEIS or in this SEIS. The decision to be made **does not** include revisiting features of the earlier decision not relating to or affected by the new information being considered. These features are reported in the previous section, and they apply generally to all SEIS alternatives.

Some aspects of the decision that has been made relate to the administrative use of snowmobiles, and personal use of snowmobiles by employees living within the interior of Yellowstone National Park. The decision commits the park service to phase in cleaner and quieter machines "as funds allow." For any measures included in the SEIS alternatives in regard to this, it should be noted--for the decision to be made-- that implementation of any decision is subject to the availability of appropriations from congress, including, for example, the funding of items such as a new snowmobile fleet. As with many other aspects of the decision to be made, the decision must be subject to the requirements of existing laws and regulations.

PUBLIC INVOLVEMENT

The NPS began the initial winter visitor use planning process (EIS) by publishing a Notice of Intent to Prepare an EIS on April 15, 1998. Public scoping comments were accepted from April 14 to July 18, 1998. Scoping brochures were distributed to about 6,000 interested parties and 12 public meetings were held throughout the GYA and in Idaho, Montana and Wyoming. In addition to local and regional meetings, the NPS hosted meetings in Salt Lake

¹⁰ Following the decision in November 2000, a proposed rule to implement the decision was published and a final rule eventually promulgated. This rule, implementing the phasing out of snowmobiles, is in effect currently. If the decision is changed as a result of the SEIS, there would be another rulemaking process.

City, Denver, Minneapolis, and Washington D.C. Overall, 2,000 comments were received, of which 1,200 of these were form letters. From this body of comment, the NPS obtained about 15,000 discrete comments. Scoping respondents included businesses; private and nonprofit organizations; local, state and federal agencies; and the public at large.

Comments were accepted from July 1999 to December 15, 1999, on the *Winter Use Plans/Draft Environmental Impact Statement the Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway*. The NPS received comments from across the United States, Canada and as far away as Germany, Saudi Arabia and Japan. Most comments came from Rocky Mountain and Northwest States. The NPS received 46,500 documents commenting on the DEIS - 6,300 unique documents and 40,200 form letters. Commenters included businesses; private and non-profit organizations; local; state; tribal and federal government agencies; and the public at large, which constituted 99% of the total body of commenters. In addition to acceptance of written public comment, the NPS held 6 public hearings in the following areas, Idaho Falls, Idaho; Livingston and West Yellowstone, Montana; Jackson and Cody, Wyoming; and Denver, Colorado. For reference, a thorough analysis of comments received on the previous draft EIS may be found in the FEIS, Volume III. The comment analysis is summarized on pages 9-11 of the FEIS.

The Winter Use Plans Final Environmental Impact Statement for the Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway was published on October 10, 2000. Although not required by CEQ regulation, the NPS invited the public to provide comment on the final FEIS until October 31, 2000. During this comment period, the NPS received 10,880 documents. Of these 6,717 were form letters and 4,163 were unique documents.

Following the signing of the ROD, the NPS initiated a rulemaking process to implement actions associated with the phase-in schedule for snowmobiles and the change to snowcoach only travel in the parks. The rule making process received a total of 5,273 comment documents in the form of letters, postcards and emails.

The above body of comment expressed a variety of winter use issues and concerns including concern for socioeconomic impacts on local communities; effects on visitor access and visitor experience; effects on air quality; the natural soundscape; and wildlife. Many comments expressed a preference for an alternative or decision. Support was expressed for alternatives proposed by the NPS, the cooperating agencies, the Greater Yellowstone Coalition and the Fund for Animals. Comments on the rule generally expressed support for

or against the use of snowmobiles in the parks. Before the initiation of the SEIS process, the NPS had received 64,653 separate comment documents on the winter use planning process.

Public Comment on the SEIS

The Notice of Intent to prepare a Winter Use Plans Supplemental Environmental Impact Statement for Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway was published in the Federal Register on July 27, 2001. The preparation of an SEIS was deemed necessary to further the purposes of NEPA. The purposes of NEPA would be furthered in this instance by "preparing an SEIS and considering new information and circumstances.... and...provide the affected public and cooperating agencies the opportunity to provide new information related to the impacts of winter use in the parks and additional opportunity to provide comments..."

The NPS received 8,443 separate documents commenting on the SEIS process.

Approximately 7,100 of these were form documents or petitions and 1,343 were unique documents. The majority of the documents expressed either support for or against the SEIS process. Commenters expressed concern for the same issues as described in the DEIS and FEIS, including concern for socioeconomic effects on local communities, effects on visitor access and visitor experience, effects on air quality, the natural soundscape, and wildlife.

A number of comments expressed opinions and concerns about the SEIS process. Some commenters expressed the opinion that there is no need for an SEIS because they believed the FEIS document was sufficient, and cited ten years of study "proving that snowmobiles damage park resources such as air quality, soundscapes and wildlife and are a risk to public safety." Other commenters expressed disagreeing opinions, saying that the present winter use plan disregarded the socioeconomic effects on local communities, the needs of the disabled and the elderly, and did not conform with applicable law, either substantively or procedurally.

Commenters that supported the SEIS process offered opinions and suggestions for action items to be included in the range of alternatives.

- Incorporating new clean and quiet snowmobile technologies
- Increasing ranger patrols to protect wildlife
- Increasing the role of the cooperating agencies
- Requiring prepaid permits and implementing a reservation system
- Phasing in clean and quiet snowmobile technologies
- Using EPA standards for snowmobile emissions
- Dispersing snowmobile use throughout the park, rather than concentrating it at Old Faithful

- Include “proper management” as a way to control snowmobiles
- Incorporate adequate phase in for new technologies and vehicle availability for snowcoaches and snowmobiles
- Separate snowcoach and snowmobile parking at Old Faithful
- Accommodate quiet winter uses through temporal or spatial zoning
- Lengthen the winter season
- Relocate the West Entrance to YNP
- Open new areas to snowmobiling

Suggestions and opinions from commenters who did not support the SEIS process included:

- Implement the existing decision and rule
- Ban snowmobiles
- Incorporate an alternative that examines no motorized winter use

The cooperating agencies participating in the SEIS process submitted a variety of studies and reports regarding the effect of winter use in the parks and on the local economies in the greater Yellowstone area and new snowmobile technologies. Submitted materials include the following reports from the State of Wyoming: "American Voters Views on Snowmobiles in National Parks", a survey prepared for the ISMA: The 2000-2001 Wyoming Snowmobile Survey, which includes surveys of resident and non-resident snowmobilers, snowmobile outfitter clients and interviews with outfitters (McManus et al. 2001); *Review of Research related to the Environmental Impact Statement for the Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway* (Institute for Environment and Natural Resources, 2000); *Review of Documents and Recommendations of the Winter Use Plans Final Environmental Impact Statement* (Western EcoSystems Technology, Inc. 2001); *Determination of Snowcoach Emissions Factor* (sic) (Southwest Research Institute, 2002); *Oversnow Vehicle Sound Level Measurements* (Jackson Hole Scientific Investigations, Inc. 2001); and *An Expert Opinion on the Reasonableness of the Cooperating Agencies' Alternative #2 for Inclusion in the Yellowstone Winter Use SEIS* (Haas et al., 2001). The *Electric Snowmobile Demonstration Project* was submitted by the State of Montana and the results from the *Society of Automotive Engineers 2001 Snowmobile Challenge* (Fussell 2001) was submitted by the State of Montana and Teton County, Wyoming. A report completed by the University of Wyoming entitled the *Economic Importance of the Winter Season to Park County, Wyoming* (Taylor 2001) was submitted by Park County, Wyoming. See Table 14 in Chapter III for a complete listing.

CONSULTATION AND COORDINATION

Cooperating Agencies

Please see discussion of cooperating agencies in the FEIS pages 16-18. During the previous EIS process, State and county governments around the GYA requested and were granted cooperating agency status (40 CFR §1501.6) in December 1997 and January 1998. The NPS also requested that the USFS become a cooperating agency because of possible impacts on surrounding national forests from changes in the parks' winter use management; the USFS acceded. In addition to these agencies, the Environmental Protection Agency (EPA) was invited to participate as a cooperator for the SEIS. There are, therefore, 10 cooperating agencies in this effort. All agencies signed a cooperating agency agreement, the terms of which are presented in Appendix B of this document. The designated representatives for all cooperating agencies are also presented in that appendix.

American Indian Tribes

The NPS is committed to recognizing the past and present existence of American Indians in the region, and the traces of their use as an important part of the cultural environment to be preserved and interpreted. NPS will consult during the SEIS process with the 24 contemporary American Indian tribes currently recognized by YNP and GTNP as traditionally affiliated with the GYA.

These tribes are:

- | | | |
|---|-------------------------------|-----------------------------------|
| • Assiniboine and Sioux | • Eastern Shoshone | • Oglala Sioux |
| • Blackfeet | • Northern Arapaho | • Rosebud Sioux |
| • Cheyenne River Sioux | • Flandreay Santee Sioux | • Shoshone-Bannock |
| • Coeur d'Alene | • Gros Ventre and Assiniboine | • Sisseton-Wahpeton Sioux |
| • Confederated Tribes of Colville Reservation | • Kiowa Tribe of Oklahoma | • Spirit Lake Sioux |
| • Confederated Salish and Kootenai Tribes | • Lower Brule Sioux | • Standing Rock Sioux |
| • Crow Creek Sioux | • Nez Perce | • Confederated Tribes of Umatilla |
| • Crow | • Northern Cheyenne | • Yankton Sioux |

State Historic Preservation Offices (SHPO)

Consultation with SHPO offices in Wyoming, Montana and Idaho during the earlier EIS process is described on page 20 of the FEIS and page 31 of the ROD. None of the three offices provided substantive comments, and indicated there was no further need to consult as the FEIS was being

prepared for publication. No comments were received from these offices as part of the SEIS process.

US Fish and Wildlife Service

Consultation with US Fish and Wildlife Service (USFWS) during the earlier EIS process is described on pages 20-21 of the FEIS, and page 31 of the ROD. A Biological Assessment (BA) was prepared to evaluate the effects of the FEIS preferred alternative (alternative G) on species listed under the Endangered Species Act. The BA was submitted to USFWS on July 5, 2000. On October 25, 2000, USFWS responded with a letter concurring with NPS' determination that implementing alternative G would not adversely affect federally listed species or migratory birds. Should the decision change because of the SEIS process, consultation will need to be reinitiated.

MAJOR ISSUES

The FEIS describes major issues (based on public comments) that relate to the purpose and need for action for the future of winter use in the three NPS units. The descriptions are presented on pages 24-26 of the FEIS document, and this material is incorporated by reference in the SEIS. These issues parallel the existing conditions identified in the purpose and need for action. For the convenience of the reader, the issues are briefly summarized here. The purpose of developing alternatives is to look at and compare different means for resolving these issues. These issue topics are important for evaluating and disclosing impacts in the FEIS, and they remain the focus for the SEIS.

Visitor Use and Access

Various user groups contend that the national parks offer either too much or not enough of various types of use. Many people contend that motorized use has greatly affected opportunities for nonmotorized use in the GYA. People who advocate for snowmobile use, including service and equipment providers in gateway communities, indicate that there is a right to personal (individual) access to the parks for this use.

Visitor Experience

Expectations for quality winter recreation experiences are different for different user groups. This raises contention between groups for which quiet, solitude and clean air needs conflict with the impacts of snowmobiles, especially when facilities for these different groups are in close proximity to each other. At issue is the nature of visitor enjoyment and its relationship to park resources and values.

Human Health and Safety

Four primary health and safety issues were identified regarding winter visitor use. These issues occur to greater or lesser degrees in various areas of the three park units. The effect of motorized vehicular emissions and noise on employees and visitors.

- Speed limits and the frequency of motor vehicle accidents and fatalities, as well as the number of nighttime collisions involving wildlife.
- Avalanche hazards.
- Safety problems where different modes of winter transport are co-located or in close proximity.

Social and Economic Issues

Many comments reflected the effect of changes in park management actions on local communities. Local businesses provide services to visitors near both parks, and many local economies rely, in part, on revenues from park visitors in the winter. Concern was voiced that eliminating oversnow travel and snowmobiles in particular or closing an entrance to a park during the winter could have a detrimental effect on local economies. Other commenters stated that concern for the parks' resources should be elevated above economics.

Natural Resources

Impacts of winter use on natural resources revolve around three major issues.

- The impact of groomed surfaces and their use on wildlife.
- The impact of snowmobile and snowcoach emissions on air quality and air quality related values.
- The impact of noise from snowmobiles and snowcoaches on the natural soundscape.

ISSUES OR CONCERNS NOT ADDRESSED IN THE SEIS

In previous SEIS discussions it has been made clear that the scope of analysis, hence the range of alternatives, is limited to provisions dealing with technological changes in motorized oversnow vehicles. Apart from plan elements that are not addressed in the SEIS, a variety of issues are not addressed.

A number of issues and concerns have been raised throughout the planning process for winter use in the three park units which are not addressed in the FEIS because they are outside the scope of analysis. For the most part, these issues will not be addressed in the SEIS, therefore the material presented on pages 26-28 of the FEIS is incorporated by reference. Topics that are not evaluated are: privatization of park facilities; wildlife carrying capacities; multiple-uses of national parklands; economic effects of park concessions; and NEPA procedures or NPS policies. In the

FEIS, NPS indicated it would not evaluate and compare winter uses with uses that occur during other seasons. The reason for this determination is that such analysis is outside the scope of the decision, and such comparisons would likely confuse the issue. Because of allegations about snowmobile emissions and noise and how they are allegedly no worse than summer wheeled vehicle traffic, NPS believes it may be useful to respond with some comparisons based on data. It should be clear, however, that the decision to be made does not include uses other than those occurring during the winter.

OTHER PLANS AND ENVIRONMENTAL ANALYSES

This section is updated from that presented in the FEIS. There are other ongoing planning efforts that relate to some elements of this EIS/plan. As other plans are approved, they can incorporate relevant portions of the winter use plans. In reference to the previous discussion of the purpose of and need for action, some comments or possible issues are more appropriately dealt with in other plans or assessments. Related planning efforts include:

- The Draft Commercial Services Plan for YNP is scheduled for completion in 2002.
- The Commercial Services Plan for GTNP is on hold, pending the completion of other analyses.
- Grand Teton has recognized the importance of developing a comprehensive transportation plan. The park completed a study of transportation needs, collected data, and initiated a public planning process as of September 2001.
- Yellowstone has taken a comprehensive look at its roads and transportation systems through several reports and studies. YNP and GTNP are also partners in the GYA Clean Cities Initiative.
- The Bison Management Plan for the State of Montana and YNP has been completed. It should not affect the winter use plan.
- GTNP has begun an assessment for reconstruction of Highway 89/287 from the north end of GTNP through the Parkway to the south boundary of YNP.

CHAPTER II

ALTERNATIVES

INTRODUCTION

This chapter presents a detailed description of four alternatives for winter visitor use in Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway. Two of the alternatives (alternatives 2 and 3) are limited specifically to actions that allow snowmobile recreation to continue in the parks. Alternative 1a is the selected alternative in the *Record of Decision for the Winter Use Plans and Final Environmental Impact Statement for Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway* (ROD) as modified by the final rule published in the *Federal Register* (Part XVII Department of the Interior, National Park Service, 36 CFR Part 7, Special Regulations, Areas of the National Park System; Final Rule) on January 22, 2001. This alternative serves as the no action alternative. Alternative 1b is the same as alternative 1a, but it defers implementation for one year.

All alternatives considered in this document must meet the stated purpose and need for action for this SEIS (see Chapter I, Purpose and Need, Scope of Analysis and Decision to be Made) by considering new snowmobile technologies and other new information related to winter visitor use.

In accordance with National Environmental Policy Act (NEPA), alternatives are presented in a comparative form and mitigation measures not already included in the alternatives are described. Alternatives are comparable to FEIS alternatives in regard to how they address existing conditions.

FORMULATION OF THE ALTERNATIVES

The alternatives for the DSEIS were formulated in response to the concern that information on new snowmobile technologies and other connected issues was not included in the original FEIS. Consequently, alternatives 2 and 3 were formulated specifically to provide an additional basis for the choice of snowmobiles as a mode of winter transportation in the parks. Each alternative proposed considers a different means of achieving the desired condition of the parks in the winter while minimizing impacts to park resources.

ALTERNATIVE DESCRIPTION

An individual alternative may consist of up to seven descriptive components: alternative actions; a map, implementation strategies; management zone description; mitigation and monitoring and adaptive management indicators and standards. All components are essential for a comprehensive understanding of each alternative. Table 9, Alternative Actions, summarizes the actions for each alternative by topic, and the components are summarized below. Table 10 summarizes alternative effects for each alternative.

Alternative Actions

The actions and assumptions common to all alternatives for the three parks are listed first, followed by actions common to all alternatives, but specific to each park. Following common actions, each alternative is explained in terms of its conceptual basis, the issues it responds to, and the specific programmatic actions, or features, that would be proposed for each park. Alternative maps show recreational zones and opportunities for each park, creating a picture of how the actions would be applied geographically.

Implementation Strategies

The outcome of the FEIS for winter use was the development of a plan for each park that addressed the existing and potential impacts on resources and values from winter recreational uses. A plan of this type is general in nature and is termed "programmatic" because it describes an overall program for winter use. Because a plan of this type is general, an analysis of environmental impacts need only be conducted at a general level. This means that it is not site specific. One of the most common comments from the public during review of a programmatic document is "how will this work?" Answering too many of these site-specific concerns in a programmatic alternative changes the level of analysis required in the document to site specific rather than programmatic. To address this concern, a section has been added to each alternative description titled *Implementation Strategies*. This section describes options that the NPS might use to implement the programmatic actions listed in the alternative.

Management Zones

In contrast to site-specificity, the definition and allocation of Management Zones is characteristic of a programmatic plan. For each alternative, the parks are divided into management zones. Management zones are defined as shown in Tables using the following characteristics.

- Desired resource condition or character
- Desired visitor experience
- Appropriate activities and facilities

Management zone definitions and locations change by alternative. The purpose of the management zone allocation is to detail the range of visitor experiences that would be provided, the resource parameters necessary to provide that experience, and to describe where in the parks each type of experience would occur. Each zone is discrete and cannot overlap with another zone. Consequently, each alternative description provides a different mix of visitor experiences and resource conditions for the parks. This approach considers and analyzes a diversity of appropriate experiences and underlying resource conditions, and helps structure future carrying capacity analyses and monitoring standards.

Adaptive Management

All alternatives include adaptive management provisions. An adaptive management plan is different from a monitoring plan in that it allows park managers to act when some information exists about a specific resource but conclusive data is currently unavailable. The first step in adaptive management is to develop and implement a management scenario based on the best available information. For example, in this document several alternatives propose a specific limit on the number of winter visitors that can enter the park daily via snowmobile. The next step is to implement an evaluation program to assess the success of the management scenario relative to defined resource thresholds. This evaluation is critical within the framework of adaptive management because of the uncertain results of the initial predictions. Managers then review the results of the evaluation program and may adjust activities or use limits to mitigate unplanned or undesirable outcomes. For example, if the visitor limits set for a park entrance have a greater or lesser effect on resource thresholds than predicted, then the number of visitors allowed to enter the parks could be raised or lowered accordingly. Further discussion on the adaptive management process may be found in Appendix I of the FEIS.

Tables 9 through 11 follow the description of alternatives and describe indicators, standards and management actions for the adaptive management scenario proposed under each alternative.

Monitoring

Monitoring is also component of all alternatives considered in this document. General resource monitoring applies when adequate information exists to make informed

management decisions based on discrete and accepted standards. It is the process of collecting information to evaluate if the objectives of a management plan are being realized. General monitoring techniques will be used to assess impacts to public health and safety; geothermal features; water quality; threatened and endangered species; trumpeter swans; and some aspects of visitor experience. A sample monitoring plan is provided for the reader in Appendix E.

Mitigation

As with alternative actions, mitigation measures represent choices for the decision-maker to incorporate based on consideration of the issues. Mitigation measures should flow logically from potential impacts disclosed in the environmental impact statement (EIS). They may involve minimizing impacts by limiting the degree or magnitude of the action, reducing or eliminating the effect over time by preservation and maintenance, or by avoiding the impact altogether.

ALTERNATIVES

Actions and Assumptions Common to All Alternatives

- None of the actions proposed under any alternative precludes closure for safety, resource protection, or other reasons as identified in 36 CFR 1.5 or 2.18.
- For the purposes of these alternatives, the following definitions are consistent throughout:
 - Oversnow motor vehicles: self-propelled vehicles intended for travel on snow, driven by a track or tracks in contact with the snow that may be steered by skis or tracks in contact with the snow. This term includes both snowmobiles and snowcoaches.
 - Snowmobiles: self-propelled vehicles intended for travel on snow, having a curb weight of not more than 1,000 pounds (450kg), driven by a track or tracks in contact with the snow, which may be steered by a ski or skis in contact with the snow. Note: The EPA definition of snowmobile is: "A vehicle designed to operate outdoors only over snow covered ground, with a maximum width of 1.5 meters or less".
 - Snowplanes: self-propelled vehicles intended for oversnow travel, having a weight of not more than 1,000 pounds (450kg) mounted on skis in contact with the snow, and driven by a pusher-propeller.
 - Snowcoaches: self-propelled, mass transit vehicles intended for travel on snow, having a curb weight of over 1,000 pounds (450kg), driven by a track or tracks and steered by skis or tracks, having a capacity of at least 8 passengers.
- If the Environmental Protection Agency (EPA) adopts standards for any class of oversnow vehicle that is more stringent than the standards resulting from this NEPA process and decision, the EPA standards shall then become the NPS standard for all oversnow vehicles entering the parks.¹
- The alternatives call for the use of sand, or an equally environmentally neutral substance, for traction on all plowed winter roads. No salts would be used. Before spring opening, sand removal operations would continue on all plowed park roads.

¹ See discussion of the proposed EPA rule in Chapter III under Air Quality.

- Investigate and implement options to reduce the palatability and accessibility to wildlife of the hydraulic fluid used in snow groomers.
- When snow depth warrants and at periodic intervals, routine plowing operations would include laying back roadside snowbanks that could be a barrier to wildlife exiting the road corridor.
- All alternatives would continue to implement transition and action plans for accessibility and support the philosophy of universal access in the parks. The NPS would make reasonable efforts to ensure accessibility to buildings, facilities, programs, and services. The NPS would develop strategies to ensure that new and renovated facilities, programs and services (including those provided by concessionaires) are designed, constructed, or offered in conformance with applicable policies, rules, regulations, and standards (including but not limited to the Architectural Barriers Act of 1968; the Americans with Disabilities Act of 1990 (ADA); the Uniform Federal Accessibility Standards of 1984 (UFAS); and the Guidelines for Outdoor Developed Areas of 1999). Architectural and Site Access and Programmatic Access: The NPS will evaluate existing buildings and existing and new programs, activities, and services (including telecommunications and media) to determine current accessibility and usability by disabled winter visitors. Action plans to remove barriers would be developed.
- Backcountry nonmotorized use would continue to be allowed throughout the parks except where designated otherwise
- The phrase "gateway communities" refers to the towns of Jackson and Cody, Wyoming, and Gardiner and West Yellowstone, Montana only.
- Require all new oversnow vehicles purchased by the parks to conform to the best environmental standards available, and that other vehicles are retrofitted whenever possible with new technologies designed to lower sound and emission levels, subject to available funding.

Actions Common to all Yellowstone Alternatives

- In Yellowstone, the NPS would continue to plow the road from Mammoth to Tower and Tower to the Northeast Entrance (Cooke City) throughout the winter. The NPS would support the state of Montana's plowing of US Highway 191 in Yellowstone.
- A designated route for *nonmotorized recreation* is defined as a marked or otherwise indicated oversnow travel way.
- Grand Canyon of the Yellowstone and the McMin Bench bighorn sheep area would continue to be closed to winter use.
- Restrict nonmotorized uses in wildlife winter ranges and thermal areas to travel on designated routes or trails.
- Winter garbage storage facilities that are wildlife-proof would be constructed in the Old Faithful, Grant, Lake, and Canyon areas.
- Continue allowing personal non-recreation use of snowmobiles by employees and their families living in the interior of Yellowstone; however, subject to available funding, provide administrative snowcoaches for their use and encourage them to replace their current snowmobiles with cleaner and quieter machines utilizing the best available technologies.
- Increase interpretive opportunities related to the unique aspects of the winter environment by providing interpretive programs at destination areas and warming huts. Provide guided interpretive programs for organized groups on snowcoaches. Provide interpretive ski and snowshoe tours and programs such as near Tower, Canyon, Mammoth, Old Faithful, West Thumb, Madison, and West Entrance.

- Provide adequate warming huts for all visitors at Old Faithful, Norris, Madison, Canyon, Fishing Bridge, Mammoth Terraces and other appropriate sites.

Actions Common to all Grand Teton and Parkway Alternatives

- In Grand Teton and the Parkway, the following roadways would continue to be plowed:
 - Highway 26/89/287 from the south boundary of the park to Moran
 - Highway 89/287 from Moran to Colter Bay
 - Highway 26/287 from Moran to the eastern park boundary
 - Teton Park Road from Moose Junction to Taggart Lake Trailhead, and from Jackson Lake Junction to Signal Mountain Lodge; from Highway 89/287 along the Pacific Creek road to the park boundary; from Kelly to the eastern park boundary; from Gros Ventre Junction to Kelly to Mailbox Corner; and the road to the eastern park boundary at Ditch Creek.
- Current winter closures would remain in effect on the Snake River floodplain, the Buffalo Fork River floodplain, and the Uhl Hill area, Willow Flats, Kelly Hill, and Static Peak (zone 9).
- Continue to provide access to inholdings and adjacent public and private lands using motorized means. This access would be a combination of plowed roads for wheeled-vehicle access, and staging areas for snowmachines traveling to immediately adjacent lands.
- Reasonable and direct access to adjacent public and private lands, or to privately owned lands within the park with permitted or historical motorized access, will continue via paved and plowed routes or via oversnow routes from GTNP.
- Increase interpretive opportunities related to the unique aspects of the winter environment by providing interpretive programs at destination areas and warming huts. Provide guided interpretive programs for organized groups on snowcoaches. Provide interpretive ski and snowshoe tours and programs at locations such as Moose, Colter Bay, and Flagg Ranch visitor services.
- Phase in administrative snowmobile types that meet the best available emission and sound limits, subject to available funding. Administrative use of snowmobiles in Grand Teton is limited to law enforcement, utility and maintenance access, and search and rescue or other use as approved by the superintendent and consistent with NPS Management Policies 8.2.3.2.
- Continue destination and support facilities at Moose, Triangle X, Colter Bay, and Flagg Ranch, and add warming hut facilities along the Teton Park Road to provide visitor services and interpretive opportunities that focus on nonmotorized uses (zone 1).

Mitigation Common to All Alternatives

Water Resources

- Best management practices will be used during the construction, reconstruction, or winter plowing of trails and roads to prevent unnecessary vegetation removal, erosion, and sedimentation.
- Separate winter-motorized trails from drainages to mitigate the routing of snowpack contaminants into surface water.
- Any new or reconstructed winter use sanitary facilities will be constructed in locations and with advanced technologies that will protect water resources.
- A focused monitoring program will reduce the uncertainty of impacts from oversnow vehicles, and if necessary indicate best management practices that might be implemented.

Wildlife, Including Federally Protected Species and Species of Special Concern

- NPS personnel will patrol sensitive resources to ensure compliance with area closures.
- Monitoring of eagle populations to identify and protect nests will continue. The park will continue to support the objectives of the Greater Yellowstone Bald Eagle Management Plan.
- Monitoring of wolf populations will continue.
- Lynx surveys will be undertaken to document the distribution and abundance of lynx in the parks and their relationship to packed surfaces. The presence of other carnivores will be documented. The parks will abide by the recommendations of the Lynx Conservation Assessment Strategy.
- Continue to assess grizzly bear abundance, distribution, and habitat selection, including the location of dens. The information obtained will assist park managers in protecting important habitats and planning recreational activities that minimize disturbance to bears. Monitoring grizzly bear populations will continue in accordance with the Interagency Grizzly Bear Management Guidelines and the parks' bear management plans.
- Monitoring and protecting trumpeter swan habitats and nests will continue, including the closure of nest sites, when warranted, to public access from February 1 to September 15.
- Monitoring potential or known winter use conflicts will result in area closures if necessary to protect wildlife habitat.
- Conduct snow track surveys for carnivores (including lynx) on both groomed and ungroomed routes.
- Continue to monitor use of groomed, ungroomed, and plowed surfaces by bison and other ungulates.

Cultural Resources

- Should the discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony occur during construction, provisions outlined in the Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001) will be followed.
- Trails and trailheads will be sited to avoid adversely impacting known cultural resources, including potential cultural landscapes. In addition, the use of natural materials and colors for all permanent signs erected will allow the signs to blend into their surroundings.

Implementation Strategies

When a decision is made following this SEIS, which sets the program goals and plan in place for winter use in the parks, some strategies may be applied to assist in the implementation of the plan. Generally, these strategies are regarded as tools that currently exist within the parks' authority to assist in *implementing* the plan. The environmental impacts, adverse or beneficial, of these strategies are not specifically addressed in this SEIS, as some actions may be categorically excluded or do not require an EIS for approval. Implementation strategies are like mitigation measures in that they may function to reduce anticipated impacts as well as facilitate the achievement of a plan goal.

- Implement an information program on snow and trail conditions, points of interest, and available recreational opportunities. Through partnerships, establish park visitor contact opportunities in gateway communities and utilize state tourism program resources.
- When snowmobiles are allowed, provide an educational video for use in gateway communities and at all area snowmobile rental businesses to educate snowmobile operators regarding safety, operational laws, user etiquette, interaction with wildlife and other park visitors, and park interpretive subjects.
- Evaluate snowcoach service on the East Entrance Road if safety goals can be met. Management of avalanche danger on the East Entrance Road may mean unscheduled closures of the road to all travel.
- Establish a reservation system, with a staggered entry time, for winter visitors.
- When designing and locating the proposed new West Entrance station, include strategies to facilitate vehicle access and improve airflow and quality.
- When snowmobiles are allowed, separate snowmobile and snowcoach parking at the Old Faithful area.

ALTERNATIVE 1A- NO ACTION

This alternative (Figures 4 and 2) was the selected alternative in the Record of Decision (ROD) for the *Winter Use Plans and Final Environmental Impact Statement for the Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway*. That decision was signed by Karen Wade, National Park Service Intermountain Regional Director, on November 22, 2000. Consequently, the version of the alternative that was published in the ROD represents the no action alternative. For clarity, elements of that decision that are not being reevaluated in this SEIS have not been repeated here. The reader is referred to Chapter I, Winter Use Plan Elements not Reevaluated in this SEIS for a complete listing of these action items.

Actions and Assumptions Common to All Units

- In the winters of 2001-2004, allow existing commercial snowcoach operators to increase their fleet size and encourage snowmobile and other new operators to purchase coaches and reduce snowmobile numbers. All limits on snowmobile use will be based on a nine-year average peak day.
 - In 2001-2002 allow snowmobile use to the current use level in YNP and GTNP and the Parkway.
 - In 2002-2003 for GTNP eliminate snowmobile use on the Teton Park Road and all motorized use on Jackson Lake².
 - In 2002-2003, allow snowmobile use at a maximum of 50% of the current use level, at the South and West Entrances of YNP. Maintain current snowmobile use levels from the East and North Entrances of YNP and the CDST and Grassy Lake road in GTNP and the Parkway.
 - In 2003-2004, all oversnow motorized visitor travel in the parks will be by snowcoach. Close the CDST through GTNP.
- Continue scientific studies and monitoring regarding winter visitor use and park resources. Close selected areas of the park, including sections of roads, to visitor use

² Discontinuance of snowplanes on Jackson Lake is not being revisited in SEIS alternatives. By the previous decision, this use is discontinued following the 2001-2002 winter season.

if scientific studies indicate that human presence or activities have a detrimental effect on wildlife or other park resources that could not otherwise be mitigated. The appropriate level of environmental assessment under NEPA will be completed for all actions as required by CEQ regulations (40 CFR parts 1500-1508).

- Give a 1-year notice before any such closure is implemented unless immediate closure is deemed necessary to avoid impairment of park resources.
- This alternative includes an affirmative commitment to implement strategies designed to provide a reasonable level of affordable winter access to park visitors.
- Permit only NPS-managed mass transit snowcoaches on designated oversnow roads.³
- Through the permitting process phase out all oversnow vehicles that do not meet the best available environmental standards for oversnow mass transit travel. Currently, the mass transit oversnow vehicle that produces the lowest emissions is the conversion van mat track.⁴
- Beginning in 2003-2004, allow mass transit snowcoaches only when their sound levels are at or below 75 decibels as measured on the A-weighted scale at 50 feet at full throttle. Continue to work with snowcoach manufacturers and operators to meet a long term goal to lower snowcoach sound levels to 70 decibels or lower.
- Prohibit late night oversnow travel from about 9 P.M. to 8 A.M.

Actions Specific to Yellowstone National Park

- Continue all existing groomed motorized routes (zone 3).
- Implement the winter use season during the period from late November to mid-March.
- Reduce administrative snowmobile use from the 106 currently used and supplement with administrative snowcoaches, subject to available funding. Phase in a limited number of administrative snowmobiles to a type that meet the best available emission and sound limits.
- Allow limited use of snowmobiles by concessionaires. Require best available clean and quiet technologies as they are developed (through permit and contracts) and encourage the use of snowcoaches.

Actions Specific to Grand Teton National Park and the Parkway

- Provide opportunities for oversnow motorized trail use (zone 3) by snowcoaches only on the unplowed, groomed surface of the highway from Colter Bay to Flagg Ranch, north into Yellowstone, and the Grassy Lake Road.
- Current Flagg Ranch permit will be honored concerning access by plowed road until the current permit expires in 2008.
- Winterize facilities at Colter Bay to provide a suitable staging area for snowcoach access.

³ Note: The term “NPS managed” refers to permit management. In this case private concessionaires who operate under a permit from the NPS would provide the mass transportation snowcoach system. Under the terms of the permit or concessions contract, the NPS may stipulate, among other items, the type of services to be offered, cost to the public, and number of visitors that may be served or transported. The NPS may require that the types of vehicles used meet certain environmental and safety requirements. It is the responsibility of the NPS to monitor all services offered under permit to ensure that the public and the parks are being well served. These permits are generally offered for competitive bidding and are granted for a specific number of years.

⁴ Estimates of emissions for conventional vans converted for oversnow travel indicate that the emissions increase once the conversion is made. For this reason adherence to EPA regulations for similar wheeled vans is neither appropriate nor required.

CHAPTER II
ALTERNATIVES

Table 1. Description of management zones for alternatives 1a and 1b.

Management Zones →	1 Destination or Support Area	2 Plowed Road	3 Groomed Motorized Route	4 Groomed Motorized Trail
Resource Condition or Character	<ul style="list-style-type: none"> Minimally to highly developed hubs of activity Facilities and signs of human activity obvious, but natural elements also present Moderate to high management and/or modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety As small as possible while still providing essential services Visitor use may compromise natural resource values 	<ul style="list-style-type: none"> As narrow as possible to protect resources, but wide enough to accommodate safety pullouts, overlooks, and trailhead areas Moderate to high management and/or modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety Good to excellent air quality Visitor use may compromise resource values 	<ul style="list-style-type: none"> Smooth groomed snow surface Generally gentle terrain Good to excellent air quality As narrow as possible to protect resources, but wide enough to accommodate safety pullouts, overlooks, and trailhead areas Moderate to high management and/or modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety Visitor use may compromise resource values Vehicles must meet sound and emission standards 	<ul style="list-style-type: none"> Narrower, groomed but less maintained snow surface Gentle to moderate terrain Vehicles must meet sound and emission standards Generally good to excellent air quality Human caused sound intermittent, audibility low to moderate As narrow as possible to protect resources, but wide enough to accommodate pullouts, overlooks trailheads, trailhead areas Minimal modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety Visitor use may compromise resource values
Visitor Experience	<ul style="list-style-type: none"> Facilities convenient and blended with adjacent resources Many opportunities for social interaction High sound levels possible High probability of encountering other visitors and NPS staff 	<ul style="list-style-type: none"> Destinations and natural attractions of high interest High probability of encountering other visitors Provides a sense of being in a natural park environment Visitor experience mostly visual Occasional quiet and solitude Commercial or residential traffic on some stretches Intermittent low to moderate sound associated with vehicular travel 	<ul style="list-style-type: none"> Destinations and natural attractions of high interest Provides a sense of being in a natural park environment High probability of encountering other visitors Solitude occasionally possible, but not expected Limited opportunities for challenge and adventure Few outdoor skills needed Some low-level sound associated with travel 	<ul style="list-style-type: none"> Natural attractions of high interest Moderate probability of encountering other visitors Chance to view the natural environment Solitude occasionally possible, but not expected Some outdoor skills necessary Some opportunities for challenge and adventure Relatively quiet; sight and smell of vehicle exhaust not expected
Appropriate Activities and Facilities	<ul style="list-style-type: none"> Visitor centers Warming huts Overnight lodging Gas stations Food services Staging areas Administrative facilities Structured interpretive programs 	<ul style="list-style-type: none"> Wheeled vehicular travel only Paved and unpaved roadways, signs, barriers Interpretive media and display Utilities Scenic overlooks, restrooms, trailhead areas, pullouts 	<ul style="list-style-type: none"> Predominantly oversnow vehicular travel; some non-vehicular travel Oversnow roads, signs, barriers Interpretive media, programs and displays Utilities Scenic overlooks, restrooms, trailhead areas, pullouts 	<ul style="list-style-type: none"> Predominantly oversnow vehicular travel; some non-vehicular travel Oversnow trails, signs, barriers Utilities, scenic overlooks, trailhead areas, restrooms

Table 1a. Description of management zones for alternatives 1a and 1b.

Management Zones→	5 Ungroomed Motorized Trail or Area	6 Groomed Nonmotorized Trail	7 Ungroomed Nonmotorized Trail or Area	8 Backcountry Nonmotorized Area	9 Sensitive Area (no winter use)
Resource Condition or Character	<ul style="list-style-type: none"> •Ungroomed snow surface •Marked except for frozen water surfaces •Gentle to moderate terrain •Vehicles must meet sound and emission standards •Generally good to excellent air quality •Sound levels intermittent, low to moderate •Wide enough to accommodate existing road corridor, pullouts, overlooks trailheads, trailhead areas •Low to moderate modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety •Visitor use may compromise resource values 	<ul style="list-style-type: none"> •Smooth groomed snow surface •Marked and signed •Generally gentle terrain •Creates predictable patterns of winter use and confines resource impacts to narrow corridors •Good to excellent air quality •Minimal modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety •Visitor use may compromise resource values •Sound from human sources is intermittent, audibility is low to nonexistent •Natural sound predominates the soundscape 	<ul style="list-style-type: none"> •Ungroomed snow surface •Marked or unmarked •Gentle to steep terrain •Creates fairly predictable patterns of winter use and confines resource impacts to relatively narrow corridors •Excellent air quality •Minimal modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety •Natural sound predominates the soundscape •Visitor use may compromise resource values 	<ul style="list-style-type: none"> •Appears natural and untouched by humans •Gentle to steep terrain •Excellent air quality •Little to no evidence of visitor impacts •Little to no modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety •Visitor use may compromise resource values •Natural sound predominates the soundscape 	<ul style="list-style-type: none"> •Appears natural and untouched by humans •Gentle to steep terrain •Excellent air quality •Little to no evidence of visitor impacts •Excellent air quality •Natural and/or cultural resource values so vulnerable that winter visitor use is not permitted
Visitor Experience	<ul style="list-style-type: none"> •Natural attractions of high interest •Moderate probability of encountering other visitors •Chance to view the natural environment •Solitude occasionally possible, but not expected •Moderate outdoor skills necessary •Moderate opportunities for challenge and adventure •Relatively quiet; sight and smell of vehicle exhaust not expected 	<ul style="list-style-type: none"> •Provides a sense of immersion in a generally natural landscape •Natural attractions of high interest •High probability of encountering other users •Solitude occasionally possible, but not expected •Provides some sense of adventure •Few outdoor skills needed •Quiet desirable but not essential for visitor enjoyment 	<ul style="list-style-type: none"> •Provides a sense of immersion in a generally natural landscape •Natural attractions of high interest •Moderate probability of encountering other users; probability increases near destination areas •Moderate opportunities for solitude •Feels somewhat distant from most comforts, conveniences, and facilities •Generally requires a commitment to time-consuming and physically and mentally exerting activities •Provides opportunities for adventure and physical challenge •Outdoor skills needed •Natural sounds predominate 	<ul style="list-style-type: none"> •Provides a strong sense of immersion in a very natural landscape •Natural quiet expected •Low probability of encountering other users; good opportunities for solitude •Provides strong sense of remoteness •Requires a commitment to time-consuming and physically and mentally exerting activities •Good opportunities for adventure and physical challenge •Outdoor skills such as route finding, avalanche hazard forecasting, and survival knowledge necessary •Natural sounds predominate 	<ul style="list-style-type: none"> •Natural soundscapes predominate
Appropriate Activities and Facilities	<ul style="list-style-type: none"> •Predominantly oversnow vehicular travel; some non-vehicular travel •Oversnow roads, signs, barriers •Interpretive displays •Utilities, restrooms, scenic overlooks, trailhead areas 	<ul style="list-style-type: none"> •Nonmotorized activities only, such as skiing and snowshoeing •Oversnow trails, markers, signs, interpretive media •Scenic overlooks, trailheads 	<ul style="list-style-type: none"> •Nonmotorized activities only, such as skiing and snowshoeing •Signs or other route markers 	<ul style="list-style-type: none"> •Nonmotorized activities only, such as skiing and snowshoeing •No facilities 	<ul style="list-style-type: none"> •Limited resource management activities •No visitor activities or facilities

Interim Snowmobile Use Limits

For the winter use season 2002-2003, the numbers of snowmobiles allowed to use the park each day are limited to the numbers represented in the following table.

Table 3. Interim cap on snowmobile use in alternative 1a for Yellowstone/Grand Teton/Parkway area road segments 2002-2003.

Entrance	Use Limit
North Entrance	60
West Entrance	278
East Entrance	65
South Entrance	90
Continental Divide Snowmobile Trail	25
Grassy Lake Road	25

Monitoring

- In order to assess the long term effects of management actions on park resources and values resource inventory, monitoring and adaptive management will be incorporated into this decision. The tables following the discussion alternatives outline specific indicators for monitoring natural resources and visitor experience in the three park units. These indicators will be monitored to ensure protection of natural resources and park values and evaluate management success.
- This alternative also includes adaptive management provisions. It will provide for systematic feedback for park management and allow for adjustment of activities to mitigate unplanned or undesirable outcomes. Tables 4 through 9 describe indicators, standards and potential management actions for adaptive management.

ALTERNATIVE 1B

Alternatives 1a and 1b differ only in their timeframe for implementation. Under alternative 1b (Figures 2 and 4) an additional year would be allowed for the phasing in of snowcoach only travel. The phase-in period is described in detail below.

Actions Specific to Yellowstone, Grand Teton and the Parkway

- In the winters of 2002-2005, allow existing commercial snowcoach operators to increase their fleet size and encourage snowmobile and other new operators to purchase coaches and reduce snowmobile numbers. All limits on snowmobile use would be based on a nine-year average peak day.
- In 2002-2003 allow snowmobile use to the current use level in YNP and GTNP and the Parkway.
- In 2002-2003 for GTNP eliminate snowmobile use on the Teton Park Road and all motorized use on Jackson Lake.
- In 2003-2004, allow snowmobile use at a maximum of 50% of the current use level, at the South and West Entrances of YNP. Maintain current snowmobile use levels from the East and North Entrances of YNP and the CDST and Grassy Lake road in GTNP and the Parkway.
- In 2004-2005, all oversnow motorized visitor travel in the parks will be by snowcoach. Close the CDST through GTNP.

- Beginning in 2004-2005, allow mass transit snowcoaches only when their sound levels are at or below 75 decibels as measured on the A-weighted scale at 50 feet at full throttle. Continue to work with snowcoach manufacturers and operators to meet a long-term goal to lower snowcoach sound levels to 70 decibels or lower.
- Beginning in 2004-2005, limit snowcoach visitation to 93,500 (nine year average annual oversnow motorized passengers) until capacity is set through adaptive management.

Interim Snowmobile Use Limits

- For the winter use season 2003-2004, the numbers of snowmobiles allowed to use the park each day are limited to the numbers represented in the following table.

Table 4. Interim cap on snowmobile use in alternative 1b for Yellowstone/Grand Teton/Parkway area road segments 2003-2004.

Entrance	Use Limit
North Entrance	60
West Entrance	278
East Entrance	65
South Entrance	90
Continental Divide Snowmobile Trail	25
Grassy Lake Road	25

ALTERNATIVE 2

This alternative (Figures 2 and 5) is an adaptive management strategy to mitigate impacts on visitor experience and access, wildlife, air quality and natural sound while allowing snowmobile access on all existing oversnow routes. Under this adaptive management scenario, interim visitor use limits would be established for each park entrance until a long-term visitor capacity study has been completed within three years. The appropriate interim snowmobile access levels consist of a mix of visitor experiences, along with adequate protection of air quality, wildlife resources, and natural soundscapes within the parks. Adaptive management programs would be implemented that would allow the success of the interim numbers to be assessed on an annual basis. Adaptive management programs will determine the need for adjusting snowmobile numbers up or down to ensure adequate protection of air quality, wildlife resources, visitor experience and natural soundscapes. Adaptive management standards for this alternative are located in this chapter in Table 11, following the description of alternatives.

Actions and Assumptions Common to All Three Units

- Phase in the use of only cleaner and quieter oversnow machines in the parks. Definition of “cleaner and quieter” and phase-in schedule as follows (all areas except Jackson Lake):
 - Snowmobiles: for all rental and outfitter sleds [70+% of existing use] – from year 1 (2002-3) forward, allow any production model 4-stroke snowmobile and any other models⁵ whose engine family⁶ meets an emission standard of 200 g/kW-hr (149 g/hp-hr) for CO and 75 g/kW-hr (56 g/hp-hr) for HC; for all “public snowmobiles” [other 30-%] – for years 1 through 3 (2002-3, 2003-2004, and 2004-2005), allow any production model 4-stroke and any two-stroke model using bio-base fuels⁷ (10% ethanol blend fuel and full synthetic low-emission oil); Year 4 (2005-6 season) and beyond - allow any production model 4-stroke snowmobile and any other models whose engine family meets an emission standard of 200 g/kW-hr (149 g/hp-hr) for CO and 75 g/kW-hr (56 g/hp-hr) for HC. A decal signifying that a snowmobile model's engine family meets the emission standard will be issued for display on snowmobile windshields. Licensed selling/certification agents outside the park would issue these "national park" certification decals as part of the Wyoming commercial registration and user fee sales process.
 - Sound levels would not exceed 75 decibels as measured on the A-weighted scale at 50 feet at 40 mph pass-by for all rental/outfitter sleds, year 1 and beyond. For public snowmobiles, sound levels would not exceed 78 decibels as measured on the A-weighted scale at 50 feet at 40 mph pass-by for years 1 through 3. Beginning in year 4 (2005-6), sound levels for all snowmobiles would not exceed 75 decibels as measured on the A-weighted scale at 50 feet at 40 mph pass-by.
 - Snowcoaches: Allow mass transit snowcoaches only when their sound levels are at or below 75 decibels as measured on the A-weighted scale at 50 feet at 30 mph pass-by. Continue to work with snowcoach manufacturers and operators to meet a long-term goal to lower snowcoach sound levels and to decrease snowcoach emission levels.
- Require park administrative and park concessionaire snowmobiles to conform to the same sound and emission requirements and phase-in schedule as “outfitter/rental” snowmobiles, as budgets and contracts allow. Park administrative and concessionaire administrative snowcoaches must conform to the same sound and emission requirements as mass transit snowcoaches.
- Immediately implement interim snowmobile use limits until a visitor capacity study is completed prior to the 2005-2006 season (within 3 years). The visitor capacity study would use one or more of the Decision Analysis Tools identified by the Federal Interagency Task Force on Visitor Capacity on Public Lands to produce visitor experience and resource standards along with indicators for long term visitor use management.
- Interim use limits and oversnow vehicle types are described by road segment in the table below.

⁵ 4-stroke technology does not guarantee low pollution or noise emissions. To clarify: all snowmobiles, 2-stroke or 4-stroke, or other means of conveyance fitting the definition of "snowmobile", are to meet the same standard for emissions expressed in this alternative feature.

⁶ The EPA certification process in which engines that are expected to have similar emission characteristics are classified in the same "engine family." Engine families are used in the process by which manufacturers can develop credits as they work toward fleet averages for emissions. An engine family is more or less defined by combustion cycle (2 or 4 stroke), cooling system, design of emission controls, bore and stroke, etc. Alternately, an engine family can consist of engines with similar emission characteristics. In either case, as long as the park has a mechanism for limiting the type of sleds entering the park, the implementation of this alternative would be feasible. In any case, it would require a listing of which engine families certify as cleaner than the emission standard.

⁷ In this alternative, the use of bio-based fuels and synthetic oils should be mandatory for 2-stroke snowmobiles used in the parks.

Table 5. Interim use limits proposed under alternative 2.

Road Segment	Vehicle Type	Interim Use Levels ⁸
Mammoth south to Old Faithful and east to Canyon and south to Fishing Bridge	Snowcoach and snowmobile travel	Snowmobiles entering through the North Entrance limited to 100 per day
West Entrance to Old Faithful	Snowcoach and snowmobile travel	Snowmobiles entering through the West Entrance limited to: •900 per day in 2002-2003, •700 per day in 2003-2004, •500 per day from 2004-2005 forward
East Entrance to Fishing Bridge	Snowmobiles only	Snowmobiles entering through the East Entrance limited to 200 per day
Fishing Bridge south to Flagg Ranch and west to Old Faithful	Snowcoach and snowmobile travel	Snowmobiles entering through the South Entrance limited to 500 per day
Continental Divide Snowmobile Trail (East Entrance GTNP to Flagg Ranch)	Snowmobiles only	Snowmobiles entering through Moran Entrance limited to 150 per day, also accounting for up to 150 per day of the 500 allowed daily through the South Entrance
Grassy Lake Road	Snowmobiles only	Feeder trail to and from national forest trails and the CDST – daily caps not applicable

- Prohibit oversnow vehicle travel, except for administrative or emergency use, into or within the parks from 8 P.M. to 7:30 A.M., except snowmobile entry through the West Entrance would be delayed until 8:30 AM.

Actions for Yellowstone National Park

- Continue all existing groomed motorized routes (zone 3).
- Lower the speed limit to 35 mph from the West Entrance to Madison to Old Faithful, and further reduce speed limit to 25 mph in specific, special areas along this segment.
- Implement the winter use season during the period from mid-November to late March.
 - Mid-November to second Tuesday in December, access only by rubber track snowcoach, snowshoes or skis.
 - Second Wednesday in December through second Sunday in March, open to access by oversnow vehicles (snowmobiles and snowcoaches), dependant upon adequate snow cover on roadways.
 - Second Monday in March until road segments are plowed, access only by snowshoes or skis.
- Require personal non-recreation snowmobiles used by employees and their families living in the interior of Yellowstone to conform to the same requirements and phase-

⁸ The rationale for these numbers is expressed in the paper by Haas 2001.

in schedule as “public” snowmobiles, as existing employment conditions allow. Subject to available funding and authority, provide administrative snowcoaches for their use.

Actions for Grand Teton and the Parkway

- Provide groomed motorized routes on the Grassy Lake Road and on the Continental Divide Snowmobile Trail (CDST). The CDST will be located immediately adjacent to the plowed roadway on a widened shoulder/borrow ditch (as future opportunities present) from the East Entrance to Moran and from Moran to Flagg Ranch.
- Permit snowmobile outfitters to operate on the CDST and the Grassy Lake Road.
- Allow snowmobile access on the frozen surface of Jackson Lake for fishing access only, “directly to and from” a fishing area with fishing gear present on snowmobile or tow sled. Snowmobiles must use Bio-Base Fuels (10% ethanol and full synthetic low emission oil). Recreational snowmobile use on Jackson Lake would not be allowed.

Table 6. Description of management zones for alternative 2.

Management Zones →	1 Destination or Support Area	2 Plowed Road	3 Groomed Motorized Route	4 Groomed Motorized Trail
Resource Condition or Character	<ul style="list-style-type: none"> Minimally to highly developed hubs of activity Facilities and signs of human activity obvious, but natural elements also present Moderate to high management and/or modification of resources to accommodate operational needs, resource protection, and safety As small as possible while still providing essential services Visitor use may compromise natural resource values 	<ul style="list-style-type: none"> As narrow as possible to protect resources, but wide enough to accommodate safety pullouts, overlooks, and trailhead areas Moderate to high management and/or modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety Good to excellent air quality Visitor use may compromise resource values 	<ul style="list-style-type: none"> Smooth groomed snow surface Generally gentle terrain Good to excellent air quality As narrow as possible to protect resources, but wide enough to accommodate safety pullouts, overlooks, and trailhead areas Moderate to high management and/or modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety Visitor use may compromise resource values Vehicles must meet sound and emission standards 	<ul style="list-style-type: none"> Narrower, groomed but less maintained snow surface Gentle to moderate terrain Vehicles must meet sound and emission standards Generally good to excellent air quality Human caused sound intermittent, audibility low to moderate As narrow as possible to protect resources, but wide enough to accommodate pullouts, overlooks Minimal modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety Visitor use may compromise resource values
Visitor Experience	<ul style="list-style-type: none"> Facilities convenient and blended with adjacent resources Many opportunities for social interaction High sound levels possible High probability of encountering other visitors and NPS staff 	<ul style="list-style-type: none"> Destinations and natural attractions of high interest High probability of encountering other visitors Provides a sense of being in a natural park environment Visitor experience mostly visual Solitude not expected Commercial or residential traffic on some stretches Intermittent low to moderate sound associated with vehicular travel expected 	<ul style="list-style-type: none"> Destinations and natural attractions of high interest Provides a sense of being in a natural park environment High probability of encountering other visitors Solitude not expected Limited opportunities for challenge and adventure Few outdoor skills needed Intermittent low to moderate sound associated with motorized over-snow vehicle travel expected 	<ul style="list-style-type: none"> Natural attractions of high interest Moderate probability of encountering other visitors Chance to view the natural environment important Solitude occasionally possible, but not expected Some outdoor skills necessary Some opportunities for challenge and adventure
Appropriate Activities and Facilities	<ul style="list-style-type: none"> Visitor centers Warming huts Overnight lodging Gas stations Food services Staging areas Administrative facilities Structured interpretive programs 	<ul style="list-style-type: none"> Wheeled vehicular travel only Paved and unpaved roadways, signs, barriers Interpretive media and display Utilities Scenic overlooks, restrooms, trailhead areas, pullouts 	<ul style="list-style-type: none"> Predominantly oversnow vehicular travel; some non-vehicular travel Oversnow roads, signs, barriers Interpretive media, programs and displays Utilities Scenic overlooks, restrooms, trailhead areas, pullouts 	<ul style="list-style-type: none"> Predominantly oversnow vehicular travel, some non-vehicular travel Oversnow trails, signs, barriers Utilities, scenic overlooks, trailhead areas, restrooms

Table 6a. Description of management zones for alternative 2.

Zones→	5 Ungroomed Motorized Trail or Area	6 Groomed Nonmotorized Trail	7 Ungroomed Nonmotorized Trail or Area	8 Backcountry Nonmotorized Area	9 Sensitive Area (no winter use)
Resource Condition or Character	<ul style="list-style-type: none"> •Ungroomed snow surface •Marked except for frozen water surfaces •Gentle to moderate terrain •Vehicles must meet sound and emission standards •Generally good to excellent air quality •Sound levels intermittent, low to moderate •Wide enough to accommodate existing road corridor, pullouts, overlooks trailheads, trailhead areas •Low to moderate modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety •Visitor use may compromise resource values 	<ul style="list-style-type: none"> •Smooth groomed snow surface •Marked and signed •Generally gentle terrain •Creates predictable patterns of winter use and confines resource impacts to narrow corridors •Good to excellent air quality •Minimal modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety •Visitor use may compromise resource values •Sound from human sources is intermittent, audibility is generally low 	<ul style="list-style-type: none"> •Ungroomed snow surface •Marked or unmarked •Gentle to steep terrain •Creates fairly predictable patterns of winter use and confines resource impacts to relatively narrow corridors •Excellent air quality •Minimal modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety •Sound from human sources is intermittent, audibility is low to nonexistent •Visitor use may compromise resource values 	<ul style="list-style-type: none"> •Appears natural and untouched by humans •Gentle to steep terrain •Excellent air quality •Little to no evidence of visitor impacts •Little to no modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety •Visitor use may compromise resource values •Natural sound predominates the soundscape 	<ul style="list-style-type: none"> •Appears natural and untouched by humans •Gentle to steep terrain •Excellent air quality •Gentle to steep terrain •Excellent air quality •Natural and/or cultural resource values so vulnerable that winter visitor use is not permitted
Visitor Experience	<ul style="list-style-type: none"> •Natural attractions of high interest •Moderate probability of encountering other visitors •Chance to view the natural environment important •Solitude occasionally possible, but not expected •Moderate outdoor skills necessary •Moderate opportunities for challenge and adventure •Relatively quiet 	<ul style="list-style-type: none"> •Provides a sense of a generally natural landscape •Natural attractions of high interest •High probability of encountering other users •Solitude occasionally possible, but not expected •Provides some sense of adventure •Few outdoor skills needed •Quiet desirable but not essential for visitor enjoyment 	<ul style="list-style-type: none"> •Provides a sense of a generally natural landscape •Natural attractions of high interest •Moderate probability of encountering other users; probability increases near destination areas •Low to moderate opportunities for solitude •Feels somewhat distant from most comforts, conveniences, and facilities •Generally requires a commitment to time-consuming and physically and mentally exerting activities •Provides opportunities for adventure and physical challenge •Outdoor skills needed •Natural sounds predominate 	<ul style="list-style-type: none"> •Provides a strong sense of immersion in a very natural landscape •Natural quiet expected •Low probability of encountering other users; good opportunities for solitude •Provides strong sense of remoteness •Requires a commitment to time-consuming and physically and mentally exerting activities •Good opportunities for adventure and physical challenge •Outdoor skills such as route finding, avalanche hazard forecasting, and survival knowledge necessary •Natural sounds predominate; natural quiet is desirable 	<ul style="list-style-type: none"> •Natural soundscapes predominate
Appropriate Activities and Facilities	<ul style="list-style-type: none"> •Predominantly oversnow vehicular travel; some non-vehicular travel •Oversnow roads, signs, barriers •Interpretive displays •Utilities, restrooms, scenic overlooks, trailhead areas 	<ul style="list-style-type: none"> •Nonmotorized activities only, such as skiing and snowshoeing; some administrative motorized vehicle travel necessary to accomplish grooming •Interpretive media •Scenic overlooks, trailheads 	<ul style="list-style-type: none"> •Nonmotorized activities only, such as skiing and snowshoeing •Signs or other route markers 	<ul style="list-style-type: none"> •Nonmotorized activities only, such as skiing and snowshoeing •No facilities, signs or route markers 	<ul style="list-style-type: none"> •Limited resource management activities •No visitor activities or facilities

Implementation Strategies for Alternative 2

Once a decision is made pursuant to this SEIS, which sets the program goals and plan in place for winter use in the parks, some strategies may be applied to assist in the implementation of the plan. Generally, these strategies are regarded as tools that currently exist within the parks' authority to assist in *implementing* the plan. The environmental impacts, adverse or beneficial, of these strategies are not specifically addressed in this SEIS, as some actions may be categorically excluded or do not require an EIS for approval.

Implementation strategies are like mitigation measures in that they may function to reduce anticipated impacts as well as facilitate the achievement of a plan goal.

- Establish an additional new daily entrance fee structure of \$10 per snowmobile and \$5 per snowcoach passenger.
- Establish a reservation system, with a timed entry limited system for all visitors. Snowmobile outfitters and gateway snowmobile rental businesses would automatically receive a daily allocation off-the-top in accordance with their operating permit [even rental shops would be required to be “permitted” by NPS to certify that their sleds meet all emission/sound requirements], not to exceed 80% of the daily entrance limit, after which public snowmobile reservations would be issued on a first-come, first-serve basis until the daily maximum entry for each gate is reached [and if the 80% was not fully utilized they would be released on a daily basis for “public” entries]. A reservation system most likely would not be fully used until use limits are implemented which decrease historic use levels at particular entrances.
- Increase ranger patrols to target wildlife concentration areas and heavy visitor use areas. Strictly enforce speed limits and off-trail travel violations by motorized and nonmotorized visitors.
- Establish an aggressive Visitor Information Program for winter recreation use of the Greater Yellowstone Area with a goal of continual evaluation and improvement. Provide optional orientation briefings each evening in partnership with gateway communities and businesses to educate all users regarding their upcoming visit to the park and what they should know about visitor safety, operational laws, user etiquette, and interaction with wildlife and other park visitors.
- Require only pre-paid entrance permits, which have been issued by outlets in West Yellowstone in conjunction with the reservation system, for all snowmobiles entering through the West Entrance. All pre-paid permits must be clearly displayed on the snowmobile windshield or on the chest of the snowmobile driver with the permit expiration date clearly visible in large numbers to facilitate efficient express entry at the entrance plaza.
- Establish incentives to increase the percentage of snowmobiles with two passengers entering YNP from the West Entrance from the current 20% to 80% within 3 to 5 years.
- Establish incentives to increase the percentage of visitors using snowcoaches to enter YNP from the West Entrance from the current 10% to 30% over 3 to 5 years.
- Establish a "Bison Brigade", consisting of trained volunteers, interns, and park rangers to make contact with visitors to provide safety and interpretive information and to provide escorts through wildlife-sensitive areas.
- Establish a "Park Watch" program to enlist visitors, snowcoach drivers and snowmobile guides to participate in reporting inappropriate behavior.

- Establish an interagency Yellowstone Recreation Advisory Council to assist recreation program management for the Greater Yellowstone Area.

ALTERNATIVE 3

This alternative (Figures 3 and 6) is an adaptive management strategy designed to mitigate impacts on visitor experience and access, wildlife, air quality and natural sound while allowing snowmobile access on all major oversnow routes. The identification of a visitor carrying capacity is a primary component of the adaptive management process under this alternative. This alternative describes a desired future condition for park resources and visitor experiences (Tables 7 and 7a). The adaptive management component of the alternative defines indicators of those experiences and resource conditions and establishes standards that describe at what point management must take action in order to maintain them.

Until that time, interim snowmobile use levels would be implemented. The interim use levels in this alternative were developed to mitigate the adverse effects of winter use on wildlife, visitor experience, air quality and natural sound that are described in the *Winter Use Plans Final Environmental Impact Statement for Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway* and the *Record of Decision for the Yellowstone and Grand Teton National Parks and the John D. Rockefeller Jr., Memorial Parkway*. Adaptive management programs would be implemented to assess the success of the interim numbers to be assessed on an annual basis. The results of the adaptive management program would determine the need for adjusting snowmobile numbers up or down to ensure adequate protection of air quality, wildlife resources, visitor experience and natural soundscapes (as defined in NPS Management Policies 2001). Adaptive management and monitoring standards and indicators for this alternative are described in Table 11 and are located at the end of this Chapter.

The visitor carrying capacity component of adaptive management would incorporate the Visitor Experience Resource Protection (VERP) model (and others) and would be completed not later than 2005.

Table 7. Description of management zones for alternative 3.

Management Zones →	1 Destination or Support Area	2 Plowed Road	3 Groomed Motorized Route	4 Groomed Motorized Trail
Resource Condition or Character	<ul style="list-style-type: none"> Minimally to highly developed hubs of activity Facilities and signs of human activity obvious, but natural elements also present Moderate to high management and/or modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety As small as possible while still providing essential services Visitor use may compromise natural resource values 	<ul style="list-style-type: none"> As narrow as possible to protect resources, but wide enough to accommodate safety pullouts, overlooks, and trailhead areas Moderate to high management and/or modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety Good to excellent air quality Visitor use may compromise resource values 	<ul style="list-style-type: none"> Smooth groomed snow surface Generally gentle terrain Good to excellent air quality As narrow as possible to protect resources, but wide enough to accommodate safety pullouts, overlooks, and trailhead areas Moderate to high management and/or modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety Visitor use may compromise resource values Vehicles must meet sound and emission standards 	<ul style="list-style-type: none"> Narrower, groomed but less maintained snow surface Gentle to moderate terrain Vehicles must meet sound and emission standards Generally good to excellent air quality Occasional human caused sound, audibility low to moderate As narrow as possible to protect resources, but wide enough to accommodate pullouts, overlooks trailheads, trailhead areas Minimal modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety Visitor use may compromise resource values
Visitor Experience	<ul style="list-style-type: none"> Facilities convenient and blended with adjacent resources Many opportunities for social interaction High sound levels possible High probability of encountering other visitors and NPS staff 	<ul style="list-style-type: none"> Destinations and natural attractions of high interest High probability of encountering other visitors Provides a sense of being in a natural park environment Visitor experience mostly visual Occasional quiet and solitude Commercial or residential traffic on some stretches Intermittent low to moderate sound associated with vehicular travel expected 	<ul style="list-style-type: none"> Destinations and natural attractions of high interest Provides a sense of being in a natural park environment High probability of encountering other visitors Solitude occasionally possible, but not expected Limited opportunities for challenge and adventure Few outdoor skills needed Some intermittent low-level to moderate sound associated with snowmachine travel expected 	<ul style="list-style-type: none"> Natural attractions of high interest Moderate probability of encountering other visitors Chance to view the natural environment important Solitude occasionally possible, but not expected Some outdoor skills necessary Some opportunities for challenge and adventure Relatively quiet; sight and smell of vehicle exhaust not expected
Appropriate Activities and Facilities	<ul style="list-style-type: none"> Visitor centers Warming huts Overnight lodging Gas stations Food services Staging areas Administrative facilities Structured interpretive programs 	<ul style="list-style-type: none"> Wheeled vehicular travel only Paved and unpaved roadways, signs, barriers Interpretive media and display Utilities Scenic overlooks, restrooms, trailhead areas, pullouts 	<ul style="list-style-type: none"> Predominantly oversnow vehicular travel; some non-vehicular travel Oversnow roads, signs, barriers Interpretive media, programs and displays Utilities Scenic overlooks, restrooms, trailhead areas, pullouts 	<ul style="list-style-type: none"> Predominantly oversnow vehicular travel; some non-vehicular travel Oversnow trails, signs, barriers Utilities, scenic overlooks, trailhead areas, restrooms

Table 7a. Description of management zones for alternative 3

Zones→	5 Ungroomed Motorized Trail or Area	6 Groomed Nonmotorized Trail	7 Ungroomed Nonmotorized Trail or Area	8 Backcountry Nonmotorized Area	9 Sensitive Area (no winter use)
Resource Condition or Character	<ul style="list-style-type: none"> •Ungroomed snow surface •Marked except for frozen water surfaces •Gentle to moderate terrain •Vehicles must meet sound and emission standards •Generally good to excellent air quality •Sound levels intermittent, low to moderate •Wide enough to accommodate existing road corridor, pullouts, overlooks •Trailheads, trailhead areas •Low to moderate modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety •Visitor use may compromise resource values 	<ul style="list-style-type: none"> •Smooth groomed snow surface •Marked and signed •Generally gentle terrain •Creates predictable patterns of winter use and confines resource impacts to narrow corridors •Good to excellent air quality •Minimal modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety •Visitor use may compromise resource values •Sound from human sources is intermittent, audibility is low to nonexistent •Natural sound predominates the soundscape 	<ul style="list-style-type: none"> •Ungroomed snow surface •Marked or unmarked •Gentle to steep terrain •Creates fairly predictable patterns of winter use and confines resource impacts to relatively narrow corridors •Excellent air quality •Minimal modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety •Natural sound predominates the soundscape •Visitor use may compromise resource values 	<ul style="list-style-type: none"> •Appears natural and untouched by humans •Gentle to steep terrain •Excellent air quality •Little to no evidence of visitor impacts •Little to no modification of resources to accommodate operational needs, resource protection, visitor enjoyment, and safety •Visitor use may compromise resource values •Natural sound predominates 	<ul style="list-style-type: none"> •Appears natural and untouched by humans •Gentle to steep terrain •Excellent air quality •Natural and/or cultural resource values so vulnerable that winter visitor use is not permitted
Visitor Experience	<ul style="list-style-type: none"> •Natural attractions of high interest •Moderate probability of encountering other visitors •Chance to view the natural environment •Solitude occasionally possible, but not expected •Moderate outdoor skills necessary •Moderate opportunities for challenge and adventure •Relatively quiet; sight and smell of vehicle exhaust not expected 	<ul style="list-style-type: none"> •Provides a sense of immersion in a generally natural landscape •Natural attractions of high interest •High probability of encountering other users •Solitude occasionally possible, but not expected •Provides some sense of adventure •Few outdoor skills needed •Quiet desirable but not essential for visitor enjoyment 	<ul style="list-style-type: none"> •Provides a sense of immersion in a generally natural landscape •Natural attractions of high interest •Moderate probability of encountering other users; probability increases near destination areas •Moderate opportunities for solitude •Feels somewhat distant from most comforts, conveniences, and facilities •Generally requires a commitment to time-consuming and physically and mentally exerting activities •Provides opportunities for adventure and physical challenge •Outdoor skills needed •Natural sounds predominate natural quiet is desirable 	<ul style="list-style-type: none"> •Provides a strong sense of immersion in a very natural landscape •Natural quiet expected •Low probability of encountering other users; good opportunities for solitude •Provides strong sense of remoteness •Requires a commitment to time-consuming and physically and mentally exerting activities •Good opportunities for adventure and physical challenge •Outdoor skills such as route finding, avalanche hazard forecasting, and survival knowledge necessary •Natural sounds predominate natural quiet is desirable 	<ul style="list-style-type: none"> •Natural soundscapes predominate
Activities and Facilities	<ul style="list-style-type: none"> •Predominantly oversnow vehicular travel, some non-vehicular travel •Oversnow roads, signs, barriers •Interpretive displays •Utilities, restrooms, scenic overlooks, trailhead areas 	<ul style="list-style-type: none"> •Nonmotorized activities only, such as skiing and snowshoeing •Oversnow trails, markers, signs, interpretive media •Scenic overlooks, trailheads 	<ul style="list-style-type: none"> •Nonmotorized activities only, such as skiing and snowshoeing •Signs or other route markers 	<ul style="list-style-type: none"> •Nonmotorized activities only, such as skiing and snowshoeing •No facilities 	<ul style="list-style-type: none"> •Limited resource management activities •No visitor activities or facilities

Actions and Assumptions Common to All Three Units

- New cleaner and quieter snowmachine technologies would be required for all recreational oversnow vehicles entering the parks. This requirement would be implemented through the issuance of outfitter and guide permits by the NPS. Initially, emission and sound requirements would be based on current best available technology and evaluated annually under an adaptive management framework⁹. The requirement to meet the best available technology will remain ongoing. The yearly evaluation would result in an adjustment of snowmobile use limits if necessary for protection of air quality, wildlife, visitor experience and natural soundscapes (as defined by NPS policy) as determined by monitoring.
- Establish a winter visitor carrying capacity for all three-park units. The carrying capacity would be determined by defining the desired future condition for park resources and visitor experiences, the indicators of a quality experience and resource conditions and the establishing of standards that describe at what point management must take action beyond that which is to be described in the decision resulting from this SEIS. In addition a monitoring program would be developed and implemented and the responsive management actions would be defined. The visitor carrying capacity study would include a public participation component and utilize the NPS approved Visitor Experience Resource Protection Framework (VERP) and other appropriate methodologies. The study would be completed no later than May 2005, subject to available funding.
- Implement interim snowmobile use limits until the visitor carrying capacity study is completed. Under this alternative, the initial interim limits would be based on the level of effect on wildlife, visitor experience, air quality and natural sound that were determined in the *Winter Use Plans Final Environmental Impact Statement for Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway*. The implementation of use limits may require one of the following: reservations, permits or differential fees. The initial interim use limits and vehicle types are described by road segment in the table below.

Table 8. Interim Use Limits Proposed Under Alternative 3.

Road Segment	Vehicle Type	Interim Use Levels
Mammoth south to Old Faithful and east to Canyon and south to Fishing Bridge	Snowcoach and snowmobile travel	Snowmobiles through the North Entrance limited to about 100 per day ¹⁰
West Entrance to Old Faithful	Snowcoach and snowmobile travel	Snowmobiles entering through the West Entrance limited to 330 snowmobiles per day
East Entrance to Fishing Bridge	Snowmobiles only	Snowmobiles entering through the East Entrance limited to about 100 per day
Fishing Bridge south to Flagg Ranch and west to Old Faithful	Snowcoach and snowmobile travel	Snowmobiles entering through the South Entrance limited to about 400 per day

⁹ Initially, the best available technology is that described in ISMA correspondence for existing, new production 4-stroke snowmobiles.

¹⁰ See DSEIS Appendix C, letter of Nov 8, 2001. Levels are set to accommodate current average daily use except for West Yellowstone, Montana where use is lower to provide a starting point to mitigate multiple resource impacts from West Yellowstone to Old Faithful resulting from present levels of use. Data indicates that use over about 300 snowmobiles causes deterioration of the snow surface on some days.

Road Segment	Vehicle Type	Interim Use Levels
Continental Divide Snowmobile Trail (East Entrance GTNP to Colter Bay)	Snowmobiles only	Snowmobiles limited to about 100 per day.
Colter to Flagg Ranch (highway surface)¹¹	Snowcoach and snowmobile travel	Snowmobiles limited to about 100 per day
Grassy Lake Road	Snowmobiles and snowcoaches	Snowmobiles - about 100 per day

- Implement an intensive adaptive management and monitoring program to ensure that desired resource conditions and visitor experiences are met. The initial monitoring and adaptive management standards and indicators are defined in Table 11.
- Beginning in the winter season of 2003-2004, allow mass transit snowcoaches only when their sound levels are at or below 75 decibels as measured on the A-weighted scale at 50 feet at full throttle. Continue to work with snowcoach manufacturers and operators to meet a long-term goal to lower snowcoach sound levels to 70 decibels or lower.
- Prohibit late night oversnow recreation travel from about 8 P.M. to 7:30 A.M. Travel during this period of time may be approved by the park superintendent for administrative or emergency purposes, or by special permit.
- In the winters of 2001-2003, allow existing commercial snowcoach operators to increase their fleet size and encourage snowmobile and other new operators to purchase coaches and reduce snowmobile numbers. Base snowmobile use limits on a 10-year average peak day.
 - In 2002-2003 allow snowmobile use to the current use level in YNP and GTNP and the Parkway.
 - In 2002-2003 for GTNP eliminate snowmobile use on the Teton Park Road and all motorized use on Jackson Lake.
 - In 2003-2004, implement interim snowmobile limits.
- Recreational snowmobile access allowed in the parks and the Parkway only when accompanied by an NPS permitted guide. Guided groups may contain from 3 to 11 snowmobiles including the guide.

Actions for Yellowstone National Park

- Continue all existing major groomed motorized routes (zone 3).
- Allow snowcoaches only on groomed motorized trails (zone 6) such as the Fountain Flats Road.
- Implement the winter use season during the period from late November to mid-March.
- To allow for a period of quiet recreation opportunities beginning the Friday following Presidents Day weekend, allow access in YNP only via snowcoach, snowshoes or skis.
- Early season travel by rubber track vehicle only until sufficient snow for snowmachines has accumulated.
- Reduce administrative snowmobile use from the 106 currently used and supplement with administrative snowcoaches, subject to available funding and authority. Phase in a limited number of administrative snowmobiles to a type that meet the best available emission and sound limits.

¹¹ Current Flagg Ranch permit will be honored concerning access by plowed road until the current permit expires in 2008.

- Continue allowing personal non-recreation use of snowmobiles by employees and their families living in the interior of Yellowstone. Subject to available funding and authority, provide administrative snowcoaches for their use and implement programs to replace their current snowmobiles with snowmobiles that utilize the best clean and quiet technologies available to meet NPS requirements.
- Allow limited use of snowmobiles by concessionaires. Require (through permit and contracts) best available clean and quiet technologies as they are developed and encourage the use of snowcoaches.
- During the winter of 2003-2004, if at least 600 snowcoach seats are not available for visitors parkwide, YNP would allow up to 220 more snowmobiles to enter through the West Entrance each day (the daily ceiling would not exceed 550 snowmobiles through the West Entrance for that winter season) so that historic average use levels are maintained. The number of coach seats will be determined as of December 1 for the upcoming winter.

Actions for Grand Teton and the Parkway

- Current Flagg Ranch permit will be honored concerning access by plowed road until the current permit expires in 2008.
- Continue existing motorized routes (zone 3), except on the Teton Park Road and the frozen surface of Jackson Lake.

THE PREFERRED ALTERNATIVE AND THE ENVIRONMENTALLY PREFERRED ALTERNATIVE

The NPS has not selected a preferred alternative for this DSEIS. Consistent with CEQ regulation 40 CFR §1502.14(e) the NPS will select a preferred alternative to be published in the FSEIS. Similarly, the NPS has not selected an environmentally preferred alternative. The NPS will select an environmentally preferred alternative as part of the decision-making process for the record of decision as required by CEQ regulation (40 CFR §1505.14(b)).

Table 9. Summary of alternative actions, Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway winter use plan.

ALTERNATIVES 1a and 1b		ALTERNATIVE 2	ALTERNATIVE 3
Emissions Standards			
•Snowcoach travel only managed by concessions permit and required to meet the best available environmental standards, (currently the mattrack snowcoach) •Phase in these standards through the permitting process		•Rental snowmobiles: 200 g/kW-hr (149g/hp-hr) for CO and 75 g/kW -hr (56g/hp-hr) for HC [proposed 2010 EPA emission rule for snowmobiles] beginning in 2002-2003 •Public snowmobiles: allow any 4 stroke and any 2-stroke using bio-fuels and lubes •By 2005-2006 all snowmobiles must meet 2010 standards	•Cleaner and quieter technologies managed by NPS permit and managed adaptively. •Interim emission requirements are based on best available technology and evaluated annually as emissions are reduced numbers could be increased
Sound Standards			
Snowcoaches: 75 decibels phasing to 70 decibels ¹		Rental snowmobiles: 75 decibels ² Public snowmobiles: 78 decibels ² Snowcoaches: 75 decibels ²	•Interim sound emission requirements are based on best available technology and evaluated annually (as sound emissions are reduced numbers could be increased)
Interim Limits and Phase In Period			
Alternative 1a •2001-2002 no change in YELL •2002-2003 close Jackson Lake and Teton Park Road to motorized vehicles •2002-2003 snowmobiles at a maximum of 50% of current average day at West and South Entrances- current use maintained at all other areas. 2003-2004 snowcoach only travel, snowmobile access maintained to inholdings and USFS areas in GRTE	Alternative 1b •2002-2003 no change in YELL •2002-2003 close Jackson Lake and Teton Park Road to motorized vehicles •2003-2004 snowmobiles at a maximum of 50% of current average day at West and South Entrances- current use maintained at all other areas. 2004-2005 snowcoach only travel, snowmobile access maintained to inholdings and USFS areas in GRTE	• Interim limit for monitoring and adaptive management program. As monitoring and carrying capacity studies indicate, use numbers may be adjusted. North Entrance limited to 100 per day •West Entrance limited to 900 in year 1 •West Entrance limited to 700 in year 2 •West Entrance limited to 500 in year 3 •East Entrance limited to 200 per day •South Entrance limited to 500 per day •Continental Divide ST 150 per day •Grassy Lake Road- no limit •Snowcoacch travel no limit	•Interim limit for 1 st year of monitoring and adaptive management program. As monitoring and carrying capacity studies indicate use numbers may be adjusted. •North Entrance limited to 100 per day •West Entrance limited to 330 per day •East Entrance limited to 100 per day •South Entrance limited to 400 per day •Continental Divide ST 100 per day •Grassy Lake- limited to 100 per day •Snowcoacch travel no limit
Access			
•All oversnow routes open to snowcoaches •Snowmachine access eliminated on the Teton Park Road and on the frozen surface of Jackson Lake •Levels of snowcoach access would be unrestricted •In 2009, the road from Colter Bay to Flagg Ranch becomes an oversnow route •Increase both the size and number of warming huts		•All oversnow routes open except snowmachine access eliminated on the Teton Park Road and fishermen only the frozen surface of Jackson Lake •Levels of access are restricted to the average peak day numbers for the West Entance and higher than peak day average for East, South and North Entrances. •Snowcoach numbers unrestricted •Increase groomed non-motorized trails •Increase both the size and number of warming huts	•All major oversnow routes open except snowmachine access eliminated on the Teton Park Road and on the frozen surface of Jackson Lake •Levels of access are restricted to slightly less than average daily totals for West Entrance, average peak day numbers for South, East and North Entrances •Snowcoach numbers unrestricted •In 2009, the road from Colter Bay to Flagg Ranch becomes an oversnow route •Increase groomed non-motorized trails •Increase both the size and number of warming huts
Wildlife			
•Non-motorized uses in wildlife winter ranges and thermal areas limited to travel on designated routes or trails •Construct wildlife -proof garbage facilities •Manage adaptively-continue scientific studies and monitoring regarding winter visitor use and park resources. Close selected areas of the parks if scientific studies indicate that human presence or activities have a detrimental effect that could otherwise not be mitigated		•Non-motorized uses in wildlife winter ranges and thermal areas limited to travel on designated routes or trails •Construct wildlife -proof garbage facilities •Employ additional law enforcement •Manage adaptively	•Non-motorized uses in wildlife winter ranges and thermal areas limited to travel on designated routes or trails •Construct wildlife -proof garbage facilities •Manage adaptively- action items include signing , employing additional enforcement rangers, limiting access
Winter Season			
•Late November to mid-March		•Mid-November to mid-December access only by rubber-tracked snowcoaches, snowshoes or skis •Mid-December to mid-March snowmobile and snowcoach travel	•Late November to mid-March •Last week of February (after President's Day) to mid--March access by snowcoach, skis or snowshoes only
Interpretation and Orientation			
•Information program on snow and trail conditions , points of interest and available recreation opportunities •Increase interpretive opportunities on the unique aspects of the winter environment. Provide interpretive programs at destination areas and at warming huts.		•Information program on snow and trail conditions , points of interest and available recreation opportunities •Increase interpretive opportunities on the unique aspects of the winter environment. Provide interpretive programs at destination areas and at warming huts. •Develop educational video on trail etiquette, snowmobile safety, and proper behavior around wildlife	•Information program on snow and trail conditions , points of interest and available recreation opportunities •Increase interpretive opportunities on the unique aspects of the winter environment. Provide interpretive programs at destination areas and at warming huts. •Develop educational video on trail etiquette, snowmobile safety, and proper behavior around wildlife

¹ Snowcoach sound measured at 50 ft on the A-weighted scale at 35-40 mph

² Snowmobile sound measured at 50 ft on the A-weighted scale at 40 mph

Table 10. Summary of effects between the existing condition and SEIS alternatives.

	FEIS Alternative A (Existing Condition)	SEIS Alternatives 1a and 1b	SEIS Alternative 2	SEIS Alternative 3
Natural Soundscape	<p><u>Audibility, considering all vehicles, wheeled and oversnow¹:</u> Audible, but less than 10% of the time, on 200,700 ac. Audible more than 10% of the time on 107,400 ac. Audible more than 50% of the time on 26,500 ac.</p> <p><u>Average Noise Level²:</u> Exceeds 50dB at 100ft along 9 segments, or 144 miles of groomed road. Exceeds 10 dB over 4000 feet distant on 11 road segments. Is highest due to oversnow use from W. Entrance to Old Faithful (56 dB) and on Jackson Lake (58 dB - snowmobiles & snowplanes).</p>	<p><u>Audibility, all vehicles:</u> Audible less than 10% of the time on 199,100 ac. (-0%). Audible more than 10% of the time on 95,060 ac (-53%). Audible more than 50% of the time on 14,090 ac. (-47%). <u>Audibility, oversnow vehicles only:</u> Less than 10% of the time on 175,220 ac. More than 10% of the time on 78,140 ac. More than 50% of the time on 2,260 ac.</p> <p><u>Average Noise Level:</u> Does not exceed 50 dB at 100 ft on any road segment. Exceeds 10 dB over 4000 feet distant on 7 segments. Is highest due to oversnow use from W. Entrance to Old Faithful at 49 dB. Noise on Jackson Lake is eliminated.</p>	<p><u>Audibility, all vehicles:</u> Audible less than 10% of the time on 182,500 ac. (-9%). Audible more than 10% of the time on 124,800 acres (+16 %). Audible more than 50% of the time on 53,090 acres (+100%). <u>Audibility, oversnow vehicles only:</u> Less than 10% of the time on 158,700 ac. More than 10% of the time on 107,850 ac. More than 50% of the time on 41,260 ac.</p> <p><u>Average Noise Level:</u> Exceeds 50 dB at 100ft along 12 segments, or 172 miles of groomed road. Exceeds 10 dB over 4000 feet distant on 13 road segments. Is highest due to oversnow use from W. Entrance to Old Faithful at 55-56 dB, and West Thumb to Flagg Ranch at 55 dB. Jackson Lake is at 46 dB for fishing access</p>	<p><u>Audibility, all vehicles:</u> Audible less than 10% of the time on 175,700 ac. (-12%). Audible more than 10% of the time on 115,000 ac. (+7%) Audible more than 50% of the time on 36,270 acres (+37%). <u>Audibility, oversnow vehicles only:</u> Less than 10% of the time on 151,860 ac. More than 10% of the time on 98,110 ac. More than 50% of the time on 24,440 ac.</p> <p><u>Average Noise Level:</u> Exceeds 50 dB at 100ft along 8 segments, or 134 miles of groomed road. Exceeds 10 dB over 4000 feet distant on 11 road segments. Is highest due to oversnow use from W. Entrance to Old Faithful at 54-55 dB and West Thumb to Flagg Ranch at 54 dB. Noise on Jackson Lake is eliminated.</p>
Air Quality (NAAQS Parameters)	<p><u>Parkwide Total Emissions (tons per year):</u> CO=1,538 tpy, PM₁₀=11 tpy, NOx=19 tpy HC=476 tpy <u>West Yellowstone:</u> Maximum 1-hour CO is 32.2 ppm (MT std is 23 ppm); 98% contributed by snowmobiles. Maximum 24-hour PM₁₀ is 68.2 µgrams/m³ (MT std is 150), 99% contributed by snowmobiles. <u>West Entrance to Madison</u> Maximum 1-hour CO is 14.8 ppm (MT std is 23 ppm); 98.6% contributed by snowmobiles. Maximum 24-hour PM₁₀ is 33.7 µgrams/m³ (MT std is 150), 97.6% contributed by snowmobiles. <u>Flagg Ranch</u> Maximum 1-hour CO is 4.72 ppm; 72% contributed by snowmobiles. Maximum 24-hour PM₁₀ Ranch is 6.0 µgrams/m³), 99.3% contributed by snowmobiles.</p>	<p><u>Parkwide Total Emissions (tons/vr):</u> After full implementation, CO=479, PM₁₀=1.0, NOx=19.0, HC=63 <u>West Yellowstone:</u> Maximum 1-hour CO is 4.5 ppm (-86%) Maximum 24-hour PM₁₀ is 23.4 µgrams/m³ (-66%)</p> <p><u>W. Entrance to Madison</u> Maximum 1-hour CO is 1.15 ppm (-92%). Maximum 24-hour PM₁₀ is 5.4 µgrams/m³ (-84%)</p> <p><u>Flagg Ranch</u> Maximum 1-hour CO is 2.0 ppm (-58%) Maximum 24-hour PM₁₀ is 5.17 µgrams/m³ (-14%)</p>	<p><u>Parkwide Total Emissions(tons/vr):</u> After full implementation in 2004-05, CO=1411, PM₁₀=10, NOx=39, HC=428 <u>West Yellowstone:</u> Maximum 1-hour CO is 7.9 ppm (-75%). Maximum 24-hour PM₁₀ is 31.2 µgrams/m³ (-54%)</p> <p><u>W. Entrance to Madison</u> Maximum 1-hour CO is 2.4 ppm (-84%). Maximum 24-hour PM₁₀ is 5.4 µgrams/m³ (-84%)</p> <p><u>Flagg Ranch</u> Maximum 1-hour CO is 1.55 ppm (-67%) Maximum 24-hour PM₁₀ is 5.46 µgrams/m³ (-9%)</p>	<p><u>Parkwide Total Emissions (tons/vr):</u> After full implementation 2003-04, CO=694, PM₁₀=1.0, NOx=84, HC=80 <u>West Yellowstone:</u> Maximum 1-hour CO is 5.8 ppm (-82%). Maximum 24-hour PM₁₀ is 24.6 µgrams/m³ (-64%)</p> <p><u>West Entrance to Madison</u> Maximum 1-hour CO is 1.45 ppm (-90%). Maximum 24-hour PM₁₀ is 5.4 µgrams/m³ (-84%)</p> <p><u>Flagg Ranch</u> Maximum 1-hour CO is 0.77 ppm (-84%) Maximum 24-hour PM₁₀ is 5.04 µgrams/m³ (-16%)</p>
Visibility	<p><u>Staging and Destination Areas</u> Emissions cause local, perceptible visibility impairment near YNP W. Entrance, in and around the Old Faithful area, and at Flagg Ranch. <u>Oversnow Routes</u> There is perceptible visibility impairment along heavily used roadway segments under certain viewing conditions.</p>	<p><u>Staging & Destination Areas</u> Emissions would not cause local, perceptible visibility impairment near YNP W. Entrance, Old Faithful, or Flagg Ranch. <u>Oversnow Routes</u> Emissions would not cause perceptible visibility impairment along roadways. (These conclusions are from the FEIS for Alternative G.)</p>	<p><u>Staging & Destination Areas</u> Analysis not completed by DSEIS publication date <u>Oversnow Routes</u> Analysis not completed by DSEIS publication date</p>	<p><u>Staging & Destination Areas</u> Analysis not completed by DSEIS publication date <u>Oversnow Routes</u> Analysis not completed by DSEIS publication date</p>
Socioeconomic Effects	<p><u>Economic Indices:</u> 1996 total economic output in MT and WY, ID: \$109.5 billion and total employment of 1.5 million jobs. 1996 total economic output in the 5-county GYA area: \$5.7 billion and 97,000 jobs. Gateway communities of Gardiner MT, West Yellowstone MT, Cody WY, Jackson WY: Status quo short term.</p> <p><u>Social Indices:</u> 67% of survey respondents agree that there should be motorized winter access to YNP. 61% of respondents also are concerned about the disturbance to wildlife in the winter. Curent winter visitors are those who are attracted by available opportunities, which at present are dominated by snowmobiling. Visitors who expect quiet nonmotorized experiences have been displaced from the parks, or their expectations are not met.</p> <p>The existing winter access policy is not preferred by the public in the region or the nation.</p>	<p><u>Economic Impacts:</u> 3 state region: - \$18.4 million (< -1%) and -471 jobs (< -1%) 5-county GYA area: - \$21.1 million (< -1%) and -499 jobs (< -1%). W. Yellowstone: winter economy down 33% short term, year round economy would decline by 8% short term (less than the annual growth). No measurable economic impact on other gateway communities.</p> <p><u>Social Impacts:</u> Motorized oversnow access is provided in all areas. Mode of access is changed to snowcoach. A majority of local residents agree that snowmobiles adversely impact the parks and should be limited. Loss of opportunities to snowmobilr may shift participation rates to other winter activities, offseting economic losses. A majority of regional and national respondents favor snowcoach access over snowmobile. This alternative would likely be favored in a regional or national forum..</p>	<p><u>Economic Impacts:</u> 3 state region: maximum loss of \$6.5 million (< -1%) and 159 jobs (< -1%). 5-county GYA area: maximum loss of \$5.8 mill. (< -1%) and 136 jobs (< -1%) West Yellowstone: winter economy would decline by a maximum of 9% short term, year round economy would decline by < 8% short term..No measurable economic impact on other gateway communities.</p> <p><u>Social Impacts:</u> Motorized oversnow access is provided in all areas. Mode of access is a mix of snowmobile and snowcoach. A majority of local residents agree that snowmobiles adversely impact the parks and should be limited. A minor decrease in opportunities to snowmobile from W. Yellowstone may shift participation to other gateways. Replacement behaviors not likely. A majority of regional and national respondents favor snowcoach access over snowmobile. This alternative would likely not be favored in a regional or national forum.</p>	<p><u>Economic Impacts</u> 3 state region: maximum loss of \$12.3 million (< -1%) and 299 jobs (< -1%). 5-county GYA area: maximum loss of \$11.1 ml. (<-1%) and 262 jobs (<-1%) West Yellowstone: winter economy would decline by a maximum of 17.6% short term, year round economy would decline by < 8% short term.No measurable economic impact on other gateway communities.</p> <p><u>Social Impacts:</u> Motorized oversnow access is provided in all areas. Mode of access is a mix of snowmobile and snowcoach. A majority of local residents agree that snowmobiles adversely impact the parks and should be limited. A minor decrease in opportunities to snowmobile from W. Yellowstone may shift participation to other gateways. Replacement behaviors not likely A majority of regional and national respondents favor snowcoach access over snowmobile. This alternative would likely not be favored in a regional or national forum.</p>

¹ Audibility numbers reported from the SEIS effects analysis, using quiet background conditions. The analysis also reports audibility considering average background conditions.

² Sound levels reported from the SEIS effects analysis, using quiet background conditions. The analysis also reports sound levels considering average background conditions.

Table 10. Summary of effects between the existing condition and SEIS alternatives.

	FEIS Alternative A (Existing Condition)	SEIS Alternatives 1a and 1b	SEIS Alternative 2	SEIS Alternative 3
Wildlife-Ungulates	<p>Effects of groomed surfaces on animal movements and population dynamics – unknown to what extent any beneficial effects outweigh negative effects.</p> <p>Displacement effects — minor to moderate, adverse, and short-term.</p> <p>Risk of collisions with snowmobiles — negligible, adverse, and short-term.</p>	<p>Fewer groomed surfaces in GTNP and JDR, therefore related effects less than in A. Same as A for YNP.</p> <p>Displacement effects < than A due to mass transit; fewer vehicles using groomed surfaces.</p> <p>Risk of collision with snowmobiles < than A due to prohibition on snowmobiles.</p>	<p>Groomed surfaces — same as A.</p> <p>Displacement effects — same as A.</p> <p>Risk of collisions with snowmobiles – same as A; effects may be mitigated by slower speed limits and the prohibition on nighttime travel from 8 p.m. to 7:30 a.m. (8:30 a.m. at the W. Entrance).</p>	<p>Groomed surfaces — same as A.</p> <p>Displacement effects — same as A; effects are mitigated by requiring snowmobilers be accompanied by NPS permitted guides.</p> <p>Risk of collisions with snowmobiles – same as A; effects may be mitigated by the prohibition on nighttime travel from 8 p.m. to 7:30 a.m. (8:30 a.m. at the W. Entrance).</p>
Health and Safety	<p><u>Safety</u> Adverse, minor effects to visitor and employee safety from the W. Entrance to Old Faithful and on the CDST. Adverse, negligible effects on less heavily traveled routes. Adverse, minor to moderate effects on visitors who use the East Entrance.</p> <p><u>Health</u> Where high levels of NAAQS pollutants occur, employees and visitors who are susceptible to respiratory problems would likely be affected. High levels occur at times and places where large numbers of oversnow vehicles stage for entry into the parks.</p>	<p><u>Safety</u> Beneficial, major and long term effects due to the elimination of snowmobiles.</p> <p><u>Health</u> High levels of NAAQS pollutants are not likely to occur. Employees and visitors who are susceptible to respiratory problems would likely not be affected.</p>	<p><u>Safety</u> Same as current condition but effects may be mitigated by the prohibition on travel from 8:00 P.M to 7:30 A.M. (8:30 A.M. through the W. Entrance), and reduced speed limits.</p> <p><u>Health</u> Where high levels of NAAQS pollutants occur, employees and visitors who are susceptible to respiratory problems would likely be affected, though to a lesser degree than in Alternative A, existing condition. High levels are likely to occur at times and places where large numbers of oversnow vehicles stage for entry into the parks. Though machines produce lower levels of pollutants, greater numbers of machines could offset the gain, relative to A.</p>	<p><u>Safety</u> Adverse, negligible to minor effects from the W. Entrance to Old Faithful. Adverse, negligible effects on the CDST from Colter Bay to Flagg Ranch due to the elimination of the shared corridor. Other effects same as current condition but effects may be mitigated by the prohibition on travel from 8:00 P.M to 7:30 A.M. (8:30 A.M. through W. Entrance) and mandatory use of guides.</p> <p><u>Health</u> Where high levels of NAAQS pollutants occur, employees and visitors who are susceptible to respiratory problems would likely be affected, though to a lesser degree than in Alternative A or Alternative 2.</p>
Visitor Access	Existing access and use defines the baseline condition for park visitation. Access is defined by travel corridors by which visitors arrive in the Greater Yellowstone Area, the gateways they use to enter the parks, the mode of transport used to enter and travel about the parks, and the levels of visitation that occur, on the average, by gateway.	These alternatives would provide access by oversnow motorized means through existing gateways at historic visitation levels. The mode of access would change from a mix of snowcoach and snowmobile to snowcoach only.	This alternative would provide access by oversnow motorized means through existing gateways. The mode of access would remain a mix of snowcoach and snowmobile. Historic use levels by snowmobile access at all gateways would be preserved. Capped use at West Yellowstone would allow current average use on a daily basis - current peak use would not be allowed. Other gateways would allow increased use by snowmobile.	This alternative would provide access by oversnow motorized means through existing gateways. The mode of access would remain a mix of snowcoach and snowmobile. Historic use levels by snowmobile access at gateways would be preserved except for that at West Yellowstone. Increased snowcoach access would be available at West Yellowstone to provide for historic visitation levels.
Visitor Experience	<p><u>Effects On All Three Park Units</u></p> <ul style="list-style-type: none">•Little or no operational change would occur. Visitation would be influenced by the method of transportation available to visitors.•For visitors who prefer to visit the parks via snowmobile, the visitor experience would continue to be highly satisfactory.•Encounters with park wildlife and scenery would continue to be primary attractions, consequently the overall satisfactio9n of current winter visitors would remain high.•Current levels of snowmobile emissions and sound levels would continue to detract from critical characteristics of the desired winter experience for many visitors resulting in direct short-term major adverse impacts on their visitor experience.•The perceived unsafe behavior of others and the occurrence of visitor conflicts would continue to have direct short-term minor to moderate adverse effects on the experience of some users.•Current motorized use would continue to deter some user groups from visiting or returning to the parks.	<p><u>Effects On All Three Park Units</u></p> <ul style="list-style-type: none">•Adaptive management provisions for long term protection of park resources may result in area closures, resulting in local direct adverse impacts on visitor experience.•The reduction in emissions and sound under this alternative would result in direct major beneficial improvements to the experiences of park visitors.•Opportunities to appreciate clean air would be greatly improved. Where oversnow motorized use occurs, via snowcoach, quiet and clean air would be facilitated by improved motorized technology.•Opportunities to view wildlife and scenery would be the same as in A.•Major beneficial changes relating to safety by eliminating the possibility of snowmobile related motor vehicle accidents. Elimination of snowmobiles would result in major adverse impacts to the experiences of visitors in this user group. <p><u>Effects on Grand Teton/Parkway</u></p> <ul style="list-style-type: none">•Negligible to minor adverse impacts on visitor experience relating to wildlife and scenery viewing due to the elimination of motorized travel on the frozen surface of Jackson Lake. •Opportunities to view wildlife would be improved for nonmotorized users of these areas.•Major beneficial changes relating to safety by eliminating snowmobile-related motor vehicle accidents, and wheeled-vehicle accidents from Colter Bay to Flagg Ranch.•Major adverse impact for those who wish to ride snowmobiles or snowplanes.	<p><u>Effects On All Three Park Units</u></p> <ul style="list-style-type: none">•Adaptive management provisions for long term protection of park resources may result in area closures, resulting in local direct adverse impacts on visitor experience.•Opportunities to appreciate clean air would be increased from alternative A providing a minor to moderate beneficial effect. Where oversnow motorized use occurs and clean air would be facilitated by improved motorized technology.•Due to the numbers of snowmobiles allowed in the parks on a daily basis, there would be a decline from current condition (FEIS alternative A) relative to opportunities for quiet and solitude. <p><u>Effects on Yellowstone</u></p> <ul style="list-style-type: none">•Snowmobile users would experience little change in opportunities to view wildlife and scenery from FEIS alternative A. However, the quality of those experiences would be moderately and adversely affected for some visitors, particularly on peak use days.•There would be few changes in the effects relating to safety from alternative A. <p><u>Effects on Grand Teton/Parkway</u></p> <ul style="list-style-type: none">•Negligible to minor adverse impacts on visitor experience relating to wildlife and scenery viewing would occur because of the elimination of motorized travel on the frozen surface of Jackson Lake. Fisherman however would not be affected.•Moderate improvements to safety by eliminating the possibility of snowmobile-related motor vehicle accidents, and wheeled-vehicle accidents on the road segment from Moran Junction to Flagg Ranch.	<p><u>Effects On All Three Park Units</u></p> <ul style="list-style-type: none">•Adaptive management provisions: same effects as shown in other alternatives.•Snowmobile users would experience little change in opportunities to view wildlife and scenery from alternative A as described in the FEIS. There would be moderate and beneficial improvements in the quality of those experiences for some visitors.•Opportunities to appreciate clean air, quiet and solitude would be increased from FEIS alternative A and decreased when compared to SEIS alternatives 1 and 2. Where oversnow motorized use occurs quiet and clean air would be facilitated by improved motorized technology and fewer vehicles. <p><u>Effects on Yellowstone</u></p> <ul style="list-style-type: none">•The use limit of 330 snowmobiles entering from the West would result in moderate to major adverse effects on approximately 300 snowmobile enthusiasts (per day) who find entering from the West Entrance essential to their park experience.•The use limit of 330 would result in moderate to major improvements to the groomed surface on that road segment. •Moderate improvements to safety because of the emphasis on guided tours and snowcoaches under this alternative. <p><u>Effects on Grand Teton/Parkway</u></p> <ul style="list-style-type: none">•Negligible to minor adverse impacts on visitor experience relating to wildlife and scenery viewing would occur because of the elimination of motorized travel on the frozen surface of Jackson Lake.•Moderate adverse effects relating to safety by continuing the possibility of snowmobile-related motor vehicle accidents, and wheeled-vehicle accidents on the road segment from Moran Junction to Flagg Ranch.

Table 11. Adaptive management indicators, standards, and methods by management zone, Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway winter use plan.

Resource Value	Destination or Support Area Zone 1								
	Indicator	Standard			Preliminary Method	Monitoring Intensity*	Management Actions		
		Alternatives 1a and 1b	Alternative 2	Alternative 3			Alternatives 1a and 1b	Alternative 2	Alternative 3
Air Quality	Odor	Area free of odor of human-caused pollutants not less than 90% of a given 24-hour period. See Resource Condition and Experience Zone 1 for this alternative.	Areas free of odor of human-caused pollutants not less than 90% of a given 24-hour period. See Resource Condition and Experience Zone 1 for this alternative.	Areas free of odor of human-caused pollutants not less than 90% of the daily hours of park operation See Resource Condition and Experience Zone 1 for this alternative. ¹	Park visitor survey Scentometer % dilution with odor free air	High	Implement or require new technologies Adjust vehicle numbers/ reduce carrying capacity	Public snowmobiles: allow any 4 stroke and any 2-stroke using bio-fuels and lubes By 2005-2006 all snowmobiles must meet EPA 2010 standards Interim limit for monitoring and adaptive management North Entrance limited to 100 per day West Entrance limited to 330 per day East Entrance limited to 100 per day South Entrance limited to 400 per day Continental Divide ST 100 per day Grassy Lake- limited to 100 per day Snowcoacch travel no limit Interim sound emission requirements are based on best available technology and evaluated annually	
	Visibility	No degradation. Area free of any visible sign of human-caused pollutants not less than 95% of a each 24-hour period See Resource Condition and Visitor Experience, Zone 1 for each alternative.	No degradation. Area free of any visible sign of human-caused pollutants not less than 90% of a each 24-hour period See Resource Condition and Visitor Experience, Zone 1 for each alternative.	No degradation. Area free of any visible sign of human-caused pollutants not less than 95% of the daily hours of park operation ³ See Resource Condition and Visitor Experience, Zone 1 for this alternative.	Photo survey and time lapse video Fixed site sampling of particulate matter (PM _{2.5} , and PM ₁₀). IMPROVE protocols	High	Implement or require new technologies Adjust vehicle numbers/ Adjust carrying capacity		
Sound	Distance and time human-caused sound is audible	% time vehicles audible at attraction sites not to exceed 50%		Average noise level not to exceed 50 dB at 100 ft for more than 50% of the daily hours of operation ⁴	Audibility logging	High	Adjust vehicle numbers/ reduce carrying capacity		
Water/ Snowpack	Water quality: pH, Hydrogen, Ammonium, Calcium, Sulfate, Nitrate, and NOx	State and federal water quality standards Also, see Resource Condition and Visitor Experience, Zone 1 for each alternative.			Spring runoff surface water sampling Snowpack sampling	Moderate	Determination and application of best management practices Implement or require new technologies Adjust vehicle numbers/ carrying capacity		
Visitor Experience	Visitor perception assessment of important park resources and values	Visitors are able to see, smell, and hear the natural environment at popular attraction sites such as Old Faithful or Jackson lake not less than 90% of each 24 hour period		Visitors are able to see, smell, and hear the natural environment at popular attraction sites such as Old Faithful or Jackson lake not less than 90% of the daily hours of park operation	Visitor survey Encounter rates Time lapse photos Travel simulation models Observations	High	Establish carrying capacity/adjust visitor numbers		
	Visitor satisfaction with opportunities to experience park values	Visitors are highly satisfied with their park experience 90% +. Also, see Resource Condition and Visitor Experience, Zone 1 for each alternative.			Visitor survey	High	Establish carrying capacity Adjust visitor numbers		

*High = Daily to weekly or in accordance with standard protocol for parameter; Moderate = Monthly to seasonally and during peak days or use periods; Low = Annually during peak use periods or at the end of the season. Applies to all zones.

¹ See NPS Management Policies (2001) 4.11 *Chemical Information and Odors*

² Snowmobile sound measured at 50 ft on the A-weighted scale at 40 mph

³ Clean Air Act (as amended, P.L. Chapter 360, 69Stat.322, 42 U.S.C. 7401 et seq.)

⁴ 50 dB was selected as an interim threshold of acceptability for the average noise level during daytime hours in the DSEIS analysis. Table 3 in the Technical Report on Noise for the FEIS shows quantitative and qualitative descriptions of typically occurring sound. The reference level of sound described as a "lower limit urban daytime ambient sound is at 40 dB. 50 dB is twice as loud as this reference level. The subjective impression of sound at 45 dB is shown as "quiet".

Table 11. Adaptive management indicators, standards, and methods by management zone, Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway winter use plan.

Resource Value	Plowed Road Zone 2								
	Indicator	Standard			Preliminary Method	Monitoring Intensity*	Management Actions		
		Alternatives 1a and 1b	Alternative 2	Alternative 3			Alternatives 1a and 1b	Alternative 2	Alternative 3
Air Quality (Public Health)	Odor	Area free of any noticeable odor of human-caused pollutants at least 90% of each 24-hour period	Area free of any noticeable odor of human-caused pollutants at least 90% of each 24-hour period	Area free of any noticeable odor of human-caused pollutants at least 90% of the daily hours of park operation	Park visitor survey Scentometer	Moderate	Implement or require new technologies Reduce emissions and implement carrying capacity	Implement or require new technologies Adjust emissions and carrying capacity	Implement or require new technologies Reduce emissions and adjust carrying capacity
	Visibility	No degradation. Area free of any visible sign of human-caused pollutants at least 95% of each 24-hour period	No degradation. Area free of any visible sign of human-caused pollutants at least 90% of each 24-hour period	No degradation. Area free of any visible sign of human-caused pollutants at least 90% of the daily hours of park operation	Photo survey and time lapse video Fixed site sampling of particulate matter (PM _{2.5} and PM ₁₀).	Moderate			
Wildlife	Bison movements on plowed roads	No unacceptable adverse effects, no disturbance	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No unacceptable adverse effects. Unacceptable effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	Continue bison monitoring, flights and photo surveys	High	Evaluate alternate transportation system Close roads	Sign and reduce speed limits in areas of recurring incidents	Evaluate alternate transportation system If mitigation measures are unsuccessful or unavailable, close roads Review annually
	Vehicle caused wildlife mortality	No unacceptable adverse effects	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	Not managed adaptively	Incident reports, roadside surveys, GIS, and visual observations	High	Sign and reduce speed limits in areas of recurring incidents	Evaluate alternate transportation system Mitigate effects or close roads	N/A
	Wildlife harassment or displacement due to vehicle sounds or movements	No unacceptable adverse effects, no disturbance	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No unacceptable adverse effects. Unacceptable effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	Incident reports, photo surveys, and visual observations	High	Increase law enforcement and information programs Close areas to use	Increase law enforcement and information programs Mitigate effects or close areas to use	Increase law enforcement and visitor information programs If mitigation measures are unsuccessful or unavailable, close roads Evaluate alternate transportation system
	Wildlife trapped by snow berms in road corridor	No unacceptable adverse effects, no disturbance	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	Same as above	Incident reports, roadside surveys, and visual observations	High	Increase number of exit berms – reevaluate location of existing exits Evaluate alternate transportation system	Increase number of exit berms – reevaluate location of existing exits Evaluate alternate transportation system	Increase number of exit berms – reevaluate location of existing exits Evaluate alternate transportation system
Sound	Distance and time human-caused sound is audible	Time vehicles audible at 100’ distance not to exceed 50 %	Time vehicles audible at 100’ distance not to exceed 50 %	Time vehicles audible above 50dB at 100’ (from roadway) distance not to exceed 20 % of the daily hours of park operation	Audibility logging	High	Implement or require new technologies Reduce sound emissions and adjust vehicle numbers	Implement/require new technologies Adjust sound emissions and vehicle numbers	
Water/ Snowpack	Water quality: pH, Hydrogen, Ammonium, Calcium, Sulfate, Nitrate, and VOCs	State and federal water quality standards	State and federal water quality standards	State and federal water quality standards	Spring runoff surface water sampling Snowpack sampling	Moderate	Determination and application of best management practices Implement or require new technologies Establish vehicle carrying capacity	Determination and application of best management practices Implement or require new technologies Establish vehicle carrying capacity	Determination and application of best management practices Implement or require new technologies Establish vehicle carrying capacity
Visitor Experience	Visitor perception assessment of important park resources and values	Visitors are able to see, smell, and hear the natural environment at roadside pullouts and interpretive trails	Visitors are able to see, smell, and hear the natural environment at roadside pullouts and interpretive trails70% of each 24 hour period	Visitors are able to see, smell, and hear the natural environment at roadside pullouts and interpretive trails 90% of each 24 hour period	Visitor survey Encounter rates Time lapse photos Travel simulation models Observations	High	Establish visitor carrying capacity/adjust visitor numbers	Establish visitor carrying capacity/adjust visitor numbers	Establish visitor carrying capacity/adjust visitor numbers
	Visitor satisfaction levels with opportunities to experience and view wildlife, scenery, and clean air and solitude.	Visitors are highly satisfied (+90%) with their park experience	Visitors are highly satisfied (+90%) with their park experience	Visitors are highly satisfied (+90%) with their park experience	Visitor survey	High	Establish visitor carrying capacity/adjust visitor numbers	Establish visitor carrying capacity/adjust visitor numbers	Establish visitor carrying capacity/adjust visitor numbers

Table 11. Adaptive management indicators, standards, and methods by management zone, Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway winter use plan.

Resource Value	Groomed Motorized Route Zone 3								
	Indicator	Standard			Preliminary Method	Monitoring Intensity*	Management Actions		
		Alternatives 1a and 1b	Alternative 2	Alternative 3			Alternatives 1a and 1b	Alternative 2	Alternative 3
Air Quality (Public Health)	Odor	Area free of any noticeable odor of human-caused pollutants at least 90% of each 24-hour period	Area free of any noticeable odor of human-caused pollutants at least 90% of each 24-hour period	Area free of any noticeable odor of human-caused pollutants at least 90% of the daily hours of park operation	Park visitor survey Scentometer at X dilution	Moderate	Implement or require new technologies Reduce emissions and implement carrying capacity Implement or require new technologies Reduce emissions and implement carrying capacity	See interim limits set in Table 1	See interim limits set in Table 1
	Visibility	No degradation. Area free of any visible sign of human-caused pollutants at least 95% of each 24-hour period	No degradation. Area free of any visible sign of human-caused pollutants at least 90% of each 24-hour period	No degradation. Area free of any visible sign of human-caused pollutants at least 95% of the daily hours of park operation	Photo survey and time lapse video Fixed site sampling of particulate matter (PM _{2.5} , and PM ₁₀).	Moderate			
Wildlife	Wildlife harassment or displacement due to vehicle sounds or movements	No unacceptable adverse effects, no disturbance	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No unacceptable adverse effects. Unacceptable effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	Incident reports, photo surveys, and visual observations	High	Sign and reduce speed limits in areas of recurring incidents Increase law enforcement and information programs Close areas to use Eliminate grooming operations Close roads Adjust grooming intensity Seasonal or daily timing restrictions Mitigate effects or close roads Adjust grooming intensity Seasonal or daily timing restrictions. Mitigate effects or close roads	Sign and reduce speed limits in areas of recurring incidents Increase law enforcement and information programs Mitigate effects or close areas to use	Sign and reduce speed limits in areas of recurring incidents Increase law enforcement and visitor information programs Mitigate effects or close areas to use
	Wildlife mortalities caused by oversnow vehicles	No unacceptable adverse effects	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	Not managed adaptively	Incident reports, roadside surveys, photo surveys, and visual observations	Low			N/A
	Bison use of groomed surfaces	No unacceptable adverse effects, no disturbance	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No unacceptable adverse effects. Unacceptable effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	Photo surveys, air surveys, and telemetry	High		Adjust grooming intensity Seasonal or daily timing restrictions Mitigate effects or close roads	Close roads or eliminate grooming operations if mitigation measures are unsuccessful or unavailable Review annually
	Lynx habitat effectiveness	No unacceptable adverse effects	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No effects. Determination of level of impact to be made by USFWS.	Carnivore and snowshoe hare track surveys	High		Adjust grooming intensity Seasonal or daily timing restrictions. Mitigate effects or close roads	Consult with USFWS for appropriate mitigation measures. Review annually
Sound	Distance and time human-caused sound is audible	Time vehicles audible at 100’ distance not to exceed 50 % of each 24 hour period	Time vehicles audible at 100’ distance not to exceed 50 % of each 24 hour period	Time vehicles audible above 50dB at 100’ (from roadway) distance not to exceed 20 % of the daily hours of park operation	Audibility logging	Moderate	Implement new technologies Reduce sound emissions/adjust vehicle numbers	See interim use limits set in Table 1	
Water/ Snowpack	Water quality: pH, Hydrogen, Ammonium, Calcium, Sulfate, Nitrate, and VOCs	State and federal water quality standards	State and federal water quality standards	State and federal water quality standards	Spring runoff surface water sampling Snowpack sampling	High	Determination and application of best management practices Implement or require new technologies Reduce vehicle emissions and implement carrying capacity	Determination and application of best management practices Implement or require new technologies Reduce vehicle emissions and implement carrying capacity	Determination and application of best management practices Implement or require new technologies Reduce vehicle emissions and implement carrying capacity
Visitor Experience	Smoothness of groomed surface	No worse than fair 20% of a 24-hour period	No worse than fair 35% of a 24-hour period	No worse than fair 20% of the daily hours of park operation	Visual observation	High	Increase grooming Mogul study to determine temperature and vehicle numbers for this management action is ongoing (Alger and Gwaltney 2000). Adjust vehicle numbers when threshold temperature is reached	Increase grooming ¹ Adjust vehicle numbers when threshold temperature is reached	Increase grooming ¹ Adjust vehicle numbers when threshold temperature is reached
	Visitor satisfaction levels with opportunities to experience park values and opportunities to view wildlife, scenery, and experience clean air and solitude.	Visitors are highly satisfied (+90%) with their park experience			Visitor surveys Encounter rates Time lapse photos Travel simulation models Observations	High	Establish visitor carrying capacities Adjust visitor numbers	Establish visitor carrying capacities Adjust visitor numbers	Establish visitor carrying capacities Adjust visitor numbers
	Visitor perception assessment of important park resources and values	Visitors are able to see, smell, and hear the natural environment at roadside pullouts and interpretive trails				High			

Table 11. Adaptive management indicators, standards, and methods by management zone, Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway winter use plan.

Resource Value	Groomed Motorized Trail Zone 4								
	Indicator	Standard			Preliminary Method	Monitoring Intensity*	Management Actions		
		Alternatives 1a and 1b	Alternative 2	Alternative 3			Alternatives 1a and 1b	Alternative 2	Alternative 3
Air Quality (Public Health)	Odor	Area free of any noticeable odor of human-caused pollutants	Area free of any noticeable odor of human-caused pollutants at least 90% of each 24 hour period	Area free of any noticeable odor of human-caused pollutants at least 95% of the daily hours of park operation See Resource and Visitor Experience conditions for this management zone	Park visitor survey	Low	Implement new technologies Reduce emissions and implement carrying capacity	Implement new technologies adjust emissions and carrying capacity	Implement new technologies Reduce emissions and implement carrying capacity
	Visibility	No degradation. Area free of any visible sign of human-caused pollutants 95% of each 24 hour period	No degradation. Area free of any visible sign of human-caused pollutants 90% of each 24 hour period	No degradation. Area free of any visible sign of human-caused pollutants 95% of the daily hours of park operation See Resource and Visitor Experience conditions for this management zone	Photo survey and time lapse video Fixed site sampling of particulate matter (PM _{2.5} , and PM ₁₀).	Low			
Wildlife	Wildlife harassment or displacement due to vehicle sounds or movements	No unacceptable adverse effects, no disturbance	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No unacceptable adverse effects. Unacceptable effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	Incident reports, photo surveys, and visual observations	High	Sign and reduce speed limits in areas of recurring incidents Increase law enforcement and information programs Close areas to use	Increase law enforcement and information programs Mitigate effects or close areas to use	Adjust visitor numbers Increase law enforcement and visitor information programs Close trails if mitigation measures are unsuccessful or unavailable Review annually
	Bison use of groomed surfaces	No unacceptable adverse effects, no disturbance	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No unacceptable adverse effects. Unacceptable effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	Photo and air surveys	Low	Eliminate grooming operations Mitigate effects or close trail	Adjust grooming intensity Seasonal or daily timing restrictions Mitigate effects or close roads	Adjust visitor numbers Close roads or eliminate grooming operations if mitigation measures are unsuccessful or unavailable Review annually
	Lynx habitat effectiveness	No unacceptable adverse effects, no disturbance	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No effects. Determination of level of impact to be made by USFWS.	Carnivore and snowshoe hare track surveys	High			Consult with USFWS for appropriate mitigation measures. Review annually
Sound	Distance and time human-caused sound is audible	Time vehicles audible at 100’ distance not to exceed 25 % of each 24 hour period	Time vehicles audible at 100’ distance not to exceed 25 % of each 24 hour period See Resource and Visitor Experience conditions for this management zone	Time vehicles audible at 100’ distance from trail not to exceed 50 dB for more than 25 % of the daily hours of park operation See Resource and Visitor Experience conditions for this management zone	Audibility logging	High	Implement or require new technologies Reduce vehicle emissions and adjust carrying capacity	Implement or require new technologies Adjust vehicle emissions carrying capacity	Implement or require new technologies Reduce vehicle emissions and adjust carrying capacity
Water Quality/ Snowpack	Water quality: pH, Hydrogen, Ammonium, Calcium, Sulfate, Nitrate, and VOCs	State and federal water quality standards	State and federal water quality standards	State and federal water quality standards	Spring runoff surface water sampling Snowpack sampling	High	Application of best management practices Implement or require new technologies Reduce vehicle emissions and adjust carrying capacity	Determination and application of best management practices Implement or require new technologies Adjust vehicle emissions and adjust carrying capacity	Determination and application of best management practices Implement or require new technologies Reduce vehicle emissions and adjust carrying capacity
Visitor Experience	Visitor perception assessment of important park resources and values	Visitors are able to see, smell, and hear the natural environment at roadside pullouts and interpretive trails. Moderate levels of solitude and quiet available	Visitors are able to see, smell, and hear the natural environment at roadside pullouts and interpretive trails 70 % of each 24-hour period. Moderate levels of solitude and quiet available	Visitors are able to see, smell, and hear the natural environment at roadside pullouts and interpretive trails 90 % of the daily hours of park operation Moderate levels of solitude and quiet available See Resource and Visitor Experience conditions for this management zone	Visitor survey Encounter rates Time lapse photos Travel simulation models Observations	High	Establish visitor carrying capacities Adjust visitor numbers	Establish visitor carrying capacities Adjust visitor numbers	Establish visitor carrying capacities Adjust visitor numbers
	Smoothness of groomed surface	No worse than fair 30% of the winter season	No worse than fair 35% of the weekly period of the parks open hours	No worse than fair 50% of the daily hours of park operation	Visual observation	Low	Increase grooming Reduce vehicle numbers or close road sections when threshold temperature is reached ¹	Increase grooming Reduce vehicle numbers or close road sections when threshold temperature is reached ¹	Increase grooming Reduce vehicle numbers or close road sections when threshold temperature is reached ¹
	Visitor satisfaction levels with opportunities to experience park values and opportunities to view wildlife, scenery, and experience clean air and solitude.	Visitors are highly satisfied (+90%) with their park experience	Visitors are highly satisfied (+90%) with their park experience	Visitors are highly satisfied (+90%) with their park experience	Visitor survey Encounter rates Time lapse photos Travel simulation models Observations	High	Establish visitor carrying capacities Adjust visitor numbers	Establish visitor carrying capacities Adjust visitor numbers	Establish visitor carrying capacities Adjust visitor numbers

*High = Daily to weekly or in accordance with standard protocol for parameter; Moderate = Monthly to seasonally and during peak days or use periods; Low = Annually during peak use periods or at the end of the season.

¹Mogul study to determine temperature and vehicle numbers for this management action is ongoing (Alger and Gwaltney 2000).

Table 11. Adaptive management indicators, standards, and methods by management zone, Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway winter use plan.

Ungroomed Motorized Trail Zone 5									
Resource Value	Indicator	Preliminary Standard			Method	Monitoring Intensity*	Management Action		
		Alternatives 1a and 1b	Alternative 2	Alternative 3			Alternatives 1a and 1b	Alternative 2	Alternative 3
Air Quality (Public Health)	Odor	Area free of any noticeable odor of human-caused pollutants	Area free of any noticeable odor of human-caused pollutants at least 90% of each 24 hour period.	Area free of any noticeable odor of human-caused pollutants at least 95% of the daily hours of park operation See Resource and Visitor Experience conditions for this management zone	Park visitor survey Scentometer, dilution X	Low	Implement or require new technologies Reduce emissions and implement carrying capacity	Implement/require new technologies Adjust emissions and carrying capacity	Implement or require new technologies Reduce emissions and implement carrying capacity
	Visibility	No degradation. Area free of any visible sign of human-caused pollutants	No degradation. Area free of any visible sign of human-caused pollutants at least 90% of each 24 hour period	No degradation. Area free of any visible sign of human-caused pollutants See Resource and Visitor Experience conditions for this management zone	Photo survey and time lapse video Fixed site sampling of particulate matter (PM _{2.5} , and PM ₁₀).	Low			
Wildlife	Wildlife harassment or displacement due to vehicle sounds or movements	No unacceptable adverse effects	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No unacceptable adverse effects. Unacceptable effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	Incident reports, photo surveys, and visual observations	Moderate	Sign and reduce speed limits in areas of recurring incidents Increase law enforcement and information programs Close areas to use	Sign and reduce speed limits in areas of recurring incidents Increase law enforcement and information programs Adjust grooming intensity Mitigate effects or close trail	Adjust visitor numbers Increase law enforcement and visitor information programs Close trails if mitigation measures are unsuccessful or unavailable Review monthly
	Lynx habitat effectiveness	No unacceptable adverse effects	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No effects. Determination of level of impact to be made by USFWS.	Carnivore and snowshoe hare track surveys	High			Consult with USFWS for appropriate mitigation measures. Review annually
Sound	Distance and time human-caused sound is audible	Time vehicles audible at 100’ distance not to exceed 25 % of each 24 hour period	Time vehicles audible at 100’ distance not to exceed 25 % of each 24 hour period	Time vehicles audible at 100’ distance not to exceed 50 dB for more than 25 % of the daily hours of park operation	Audibility logging	High	Implement new technologies Reduce sound emissions or adjust vehicle numbers	Implement new technologies Adjust sound emissions or adjust vehicle numbers	Implement new technologies Reduce sound emissions or adjust vehicle numbers
Water/ Snowpack	Surface water sampling of pH, Hydrogen, Ammonium, Calcium, Sulfate, Nitrate, and VOCs	State and federal water quality standards	State and federal water quality standards	State and federal water quality standards	Spring runoff surface water sampling Snowpack sampling	Low	Determination and application of best management practices Implement or require new technologies Reduce vehicle emissions and adjust carrying capacity	Determination and application of best management practices Implement or require new technologies Adjust vehicle emissions and carrying capacity	Determination and application of best management practices Implement or require new technologies Reduce vehicle emissions and adjust carrying capacity
Visitor Experience	Visitor perception assessment of important park resources and values	Visitors are able to see, smell, and hear the natural environment at roadside pullouts and interpretive trails. Moderate levels of solitude and quiet available	Visitors are able to see, smell, and hear the natural environment at roadside pullouts and interpretive trails 80% of each 24 hour period. Moderate levels of solitude and quiet available	Visitors are able to see, smell, and hear the natural environment at roadside pullouts and interpretive trails. Moderate levels of solitude and quiet available	Visitor survey Encounter rates Time lapse photos Travel simulation models Observations	High	Establish visitor carrying capacities Adjust visitor numbers Establish visitor carrying capacities Adjust visitor numbers	Establish visitor carrying capacities Adjust visitor numbers Establish visitor carrying capacities Adjust visitor numbers	Establish visitor carrying capacities Adjust visitor numbers Establish visitor carrying capacities Adjust visitor numbers
	Visitor satisfaction levels with opportunities to experience park values and opportunities to view wildlife, scenery, and experience clean air and solitude	Visitors are highly satisfied (+90%) with their park experience	Visitors are highly satisfied (+90%) with their park experience	Visitors are highly satisfied (+90%) with their park experience		High			

*High = Daily to weekly or in accordance with standard protocol for parameter; Moderate = Monthly to seasonally and during peak days or use periods; Low = Annually during peak use periods or at the end of the season.

Table 11. Adaptive management indicators, standards, and methods by management zone, Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway winter use plan.

Groomed Nonmotorized Trail Zone 6									
Resource Value	Indicator	Preliminary Standard			Method	Monitoring Intensity*	Management Actions		
		Alternatives 1a and 1b	Alternative 2	Alternative 3			Alternatives 1a and 1b	Alternative 2	Alternative 3
Air Quality (Public Health)	Odor	Area free of any noticeable odor of human-caused pollutants	Area free of any noticeable odor of human caused pollutants at least 90% of each 24 hour period	Area free of any noticeable odor of human-caused pollutants See Resource and Visitor Experience conditions for this management zone	Park visitor survey	Low	Implement or require new technologies Reduce emissions and implement carrying capacity	Implement or require new technologies Adjust emissions and carrying capacity (See interim use limits described in Table X)	Implement new technologies Reduce emissions and implement carrying capacity (See interim use limits described in Table X)
	Visibility	No degradation. Area free of any visible sign of human-caused pollutants	No degradation. Area free of any visible sign of human-caused pollutants at least 90% of each 24 hour period	No degradation. Area free of any visible sign of human-caused pollutants See Resource and Visitor Experience conditions for this management zone	Photo survey and time lapse video Fixed site sampling of particulate matter (PM _{2.5} and PM ₁₀)	Low			
Wildlife	Wildlife harassment or displacement from habitat as a result of visitor activities	No unacceptable adverse effects	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No unacceptable adverse effects. Unacceptable effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	Incident reports, photo surveys, visual observations	High	Increase law enforcement and visitor information Use of designated trails only Close areas to use	Increase law enforcement and visitor information Use of designated trails only Mitigate effects or close areas to use	Increase law enforcement and visitor information programs Close trails if mitigation measures are unsuccessful or unavailable Review monthly
	Lynx habitat effectiveness	No unacceptable adverse effects	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No effects. Determination of level of impact to be made by USFWS.	Carnivore and snowshoe hare track surveys	High	Eliminate grooming operations or close trail	Adjust grooming intensity Mitigate effects or close trail	Consult with USFWS for appropriate mitigation measures. Review annually
Sound	Distance and time human-caused sound is audible	Time vehicles audible at 500’ distant from trailhead or motorized route not to exceed 10 % during daylight hours (8am-4pm).	Time vehicles audible at 1/2 mile from trailhead or motorized rout not to exceed 20% during daylight hours (8AM to 4PM)	Time vehicles audible at 4,000 feet from trailhead or motorized route not to exceed 10 dB ⁵ for more than 20 % of hours of operations See Resource and Visitor Experience conditions for this management zone	Audibility logging	High	Implement new technologies Reduce sound emissions or adjust vehicle numbers	Implement new technologies Adjust sound emissions or adjust vehicle numbers	Implement new technologies Reduce sound emissions or adjust vehicle numbers
Visitor Experience	Visitor perception assessment of important park resources and values	Visitors are able to see, smell, and hear the natural environment and to experience quiet and solitude	Visitors are able to see, smell, and hear the natural environment and to experience quiet and solitude 90% of the time when on trails greater than 1/2 mile from destination areas plowed roads and motorized trails	Visitors are able to see, smell, and hear the natural environment and to experience quiet and solitude 90% of the time when on trails greater than 500 ' from plowed roads and motorized trails and 1/2 mile from destination areas ⁶	Visitor survey Encounter rates Time lapse photos Travel simulation models Observations	High	Establish visitor carrying capacities Adjust visitor numbers		
	Visitor satisfaction levels with opportunities to experience park values and opportunities to view wildlife, scenery, and experience clean air and solitude	Visitors are highly satisfied (+90%) with their park experience	Visitors are highly satisfied (+90%) with their park experience	Visitors are highly satisfied (+90%) with their park experience		High			Establish visitor carrying capacities Adjust visitor numbers

*High = Daily to weekly or in accordance with standard protocol for parameter; Moderate = Monthly to seasonally and during peak days or use periods; Low = Annually during peak use periods or at the end of the season.

⁵ 10 dB is above the threshold of human hearing and is audible more or less depending upon the frequency and duration of noise, as well as the background sound.

⁶ This standard is based on several statements of policy found in NPS Management Policies (2001). Refer to 4.9 Soundscape Management and 6.4.3.1 Wilderness Use Management.

Table 11. Adaptive management indicators, standards, and methods by management zone, Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway winter use plan.

Ungroomed Nonmotorized Trail or Area Zone 7									
Resource Value	Indicator	Preliminary Standard			Method	Monitoring Intensity*	Management Actions		
		Alternatives 1a and 1b	Alternative 2	Alternative 3			Alternatives 1a and 1b	Alternative 2	Alternative 3
Air Quality (Public Health)	Odor	Area free of any noticeable odor of human-caused pollutants	Area free of any noticeable odor of human-caused pollutants	Area free of any noticeable odor of human-caused pollutants See Resource and Visitor Experience conditions for this management zone	Park visitor survey	Low	Implement new technologies Reduce emissions and/or adjust carrying capacity	Implement new technologies Adjust emissions and/or adjust carrying capacity	Implement new technologies Reduce emissions and/or adjust carrying capacity
	Visibility	No degradation. Area free of any visible sign of human-caused pollutants	No degradation. Area free of any visible sign of human-caused pollutants	No degradation. Area free of any visible sign of human-caused pollutants See Resource and Visitor Experience conditions for this management zone	Photo survey and time lapse video Fixed site sampling of particulate matter (PM _{2.5} and PM ₁₀)	Low			
Wildlife	Human bear conflicts during pre- and post denning periods	No unacceptable adverse effects	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No incidents	Mapping of denning areas and visitor use patterns and trends Incident reports	Moderate	Increase law enforcement and visitor information Use of designated trails only Close areas to use	Increase law enforcement and visitor information Use of designated trails only Mitigate effects or close areas to use	Increase law enforcement and visitor information programs Close denning areas to human use in fall and spring Require use of designated trails only Review monthly
	Wildlife harassment or displacement from habitat as a result of visitor activities	No unacceptable adverse effects	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No unacceptable adverse effects. Unacceptable effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	Incident reports, photo surveys and visual observations	High			Increase law enforcement and visitor information programs Close trails if mitigation measures are unsuccessful or unavailable Review annually
	Lynx habitat effectiveness	No unacceptable adverse effects	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No effects. Determination of level of impact to be made by USFWS.	Carnivore and snowshoe hare track surveys	High	Mitigate effects or close trail	Mitigate effects or close trail or area Seasonal or daily timing restrictions	Consult with USFWS for appropriate mitigation measures Review annually.
Sound	Distance and time human-caused sound is audible	Time vehicles audible at 500’ from trailhead or motorized route not to exceed 10 % during daylight hours (8AM-4PM).	Time vehicles audible at 1/2 mile from trailhead or motorized route not to exceed 10 % during daylight hours.	Time vehicles audible at 4,000’ from trailhead or motorized route not to exceed 10 dB for more than 20 % of daily hours of park operation	Audibility logging	High	Implement new technologies Reduce sound emissions or adjust vehicle numbers		Implement new technologies Reduce sound emissions or adjust vehicle numbers
Visitor Experience	Visitor perception assessment of important park resources and values	Visitors are able to see, smell, and hear the natural environment. Frequent opportunities to experience quiet and solitude are available	Visitors are able to see, smell, and hear the natural environment and to experience quiet and solitude 90% of the time when on trails greater than 1/2 mile from destination areas plowed roads and motorized trails	Visitors are able to see, smell, and hear the natural environment and to experience quiet and solitude 90% of the daily hours of park operation when on trails greater than 500 ' from plowed roads and motorized trails and 4000' from destination areas	Visitor surveys Encounter rates Time lapse photos Travel simulation models Observations	High	Establish visitor carrying capacities Adjust visitor numbers	Establish visitor carrying capacities Adjust visitor numbers	Establish visitor carrying capacities Adjust visitor numbers
	Visitor satisfaction levels with opportunities to experience park values and opportunities to view wildlife, scenery, and experience clean air and solitude	Visitors are highly satisfied (+90%) with their park experience	Visitors are highly satisfied (+90%) with their park experience	Visitors are highly satisfied (+90%) with their park experience		High			

*High = Daily to weekly or in accordance with standard protocol for parameter; Moderate = Monthly to seasonally and during peak days or use periods; Low = Annually during peak use periods or at the end of the season.

Table 11. Adaptive management indicators, standards, and methods by management zone, Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway winter use plan.

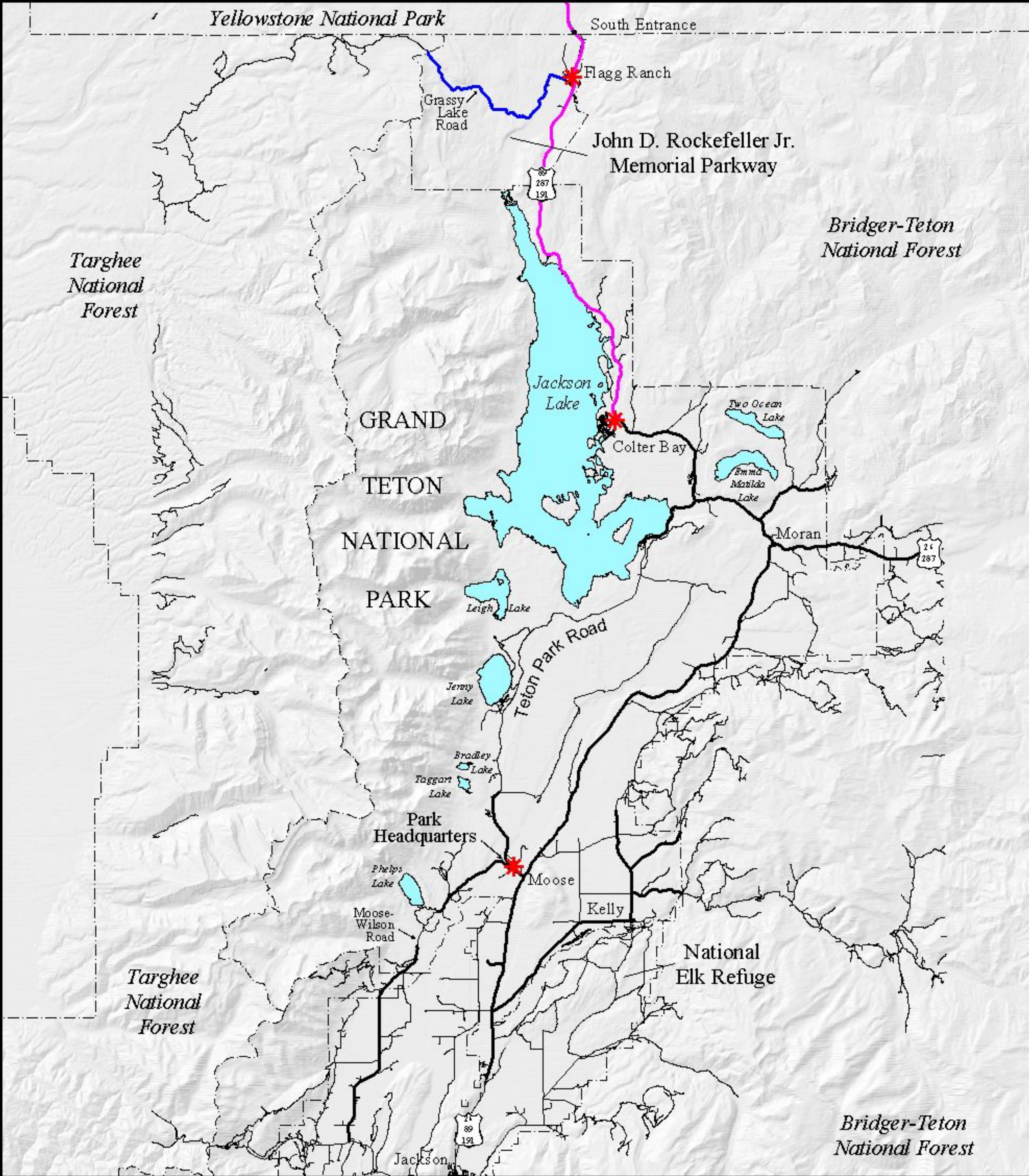
Backcountry Nonmotorized Trail or Area Zone 8									
Resource Value	Indicator	Preliminary Standard			Method	Monitoring Intensity*	Management Actions		
		Alternatives 1a and 1b	Alternative 2	Alternative 3			Alternative 1a and 1b	Alternative 2	Alternative 3
Air Quality (Public Health)	Odor	Area free of any noticeable odor of human-caused pollutants	Area free of any noticeable odor of human-caused pollutants	Area free of any noticeable odor of human-caused pollutants	Park visitor survey Scentometer dilution at X	Low	Reduce emissions and adjust carrying capacity Implement new technologies	Adjust emissions and carrying capacity Implement/require new technologies	Reduce emissions and adjust carrying capacity Implement new technologies
	Visibility	No degradation. Area free of any visible sign of human-caused pollutants	No degradation. Area free of any visible sign of human-caused pollutants	No degradation. Area free of any visible sign of human-caused pollutants	Photo survey and time lapse video Fixed site sampling of particulate matter (PM _{2.5} , and PM ₁₀)	Moderate			
Wildlife	Human bear conflicts during pre- and post denning periods	No unacceptable adverse effects	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No incidents	Mapping of denning areas and visitor use patterns and trends Incident reports	High	Increase law enforcement and visitor information programs Require use of designated trails only	Increase law enforcement and visitor information Use of designated trails only Mitigate effects or close areas to use	Increase law enforcement and visitor information programs Close denning areas to human use in fall and spring Require use of designated trails only Review monthly
	Wildlife harassment or displacement from habitat as a result of visitor activities	No unacceptable adverse effects	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No unacceptable adverse effects. Unacceptable effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	Incident reports, photo surveys and visual observations	High	Increase law enforcement and visitor information Use of designated trails only Close areas to use	Increase law enforcement and visitor information Use of designated trails only Mitigate effects or close areas to use	Increase law enforcement and visitor information programs Close trails if mitigation measures are unsuccessful or unavailable Review annually
	Lynx habitat effectiveness	No unacceptable adverse effects	No significant adverse effects. Significant adverse effects are those considered greater than “adverse negligible”. See page xx for definitions of effects.	No effects. Determination of level of impact to be made by USFWS.	Carnivore and snowshoe hare track surveys	High	Mitigate effects or close areas to use	Mitigate effects or close trail to use Seasonal time restrictions	Consult with USFWS for appropriate mitigation measures; review annually.
Water Quality/ Snowpack	Water quality: pH, hydrogen, ammonium, calcium, sulfate, nitrate, and VOCs	State and federal water quality standards	State and federal water quality standards	State and federal water quality standards	Spring runoff surface water sampling Snowpack sampling	Moderate	Determination and application of best management practices Implement new technologies Reduce vehicle emissions and adjust carrying capacity	Determination and application of best management practices Implement new technologies Adjust vehicle emissions and carrying capacity	Determination and application of best management practices Implement new technologies Reduce vehicle emissions and adjust carrying capacity
Sound	Distance and time human-caused sound is audible	Time vehicles audible at 500’ distant from trailhead or motorized route not to exceed 10 % during the hours (8AM-4PM). Vehicles not audible beyond 1000’ from TH or motorized route.	Time vehicles audible at 1/2 mile from trailhead or motorized route not to exceed 10 % during the hours (8AM-4PM). Vehicles not audible beyond 1 mile from TH or motorized route.	Time vehicles audible at 4,000’ from trailhead or motorized route not to exceed 10 dB for more than 20 % of daily hours of park operation	Audibility logging	Moderate	Implement new technologies Reduce sound emissions or adjust vehicle numbers	Implement new technologies Adjust sound emissions or vehicle numbers	Implement new technologies Reduce sound emissions or adjust vehicle numbers
Visitor Experience	Visitor perception assessment of important park resources and values	Visitors are able to see, smell, and hear the natural environment. Opportunities to experience quiet and solitude dominate	Visitors are able to see, smell, and hear the natural environment and to experience quiet and solitude 90% of the time when on trails greater than 1/2 mile from destination areas plowed roads and motorized trails	Visitors are able to see, smell, and hear the natural environment. Opportunities to experience quiet and solitude dominate and are available at least 95% of the time in areas greater than 1/4 mile from a motorized road, trail or route and 1/2 mile from a destination area.	Visitor survey Encounter rates Time lapse photos Travel simulation models Observations	Moderate	Establish visitor carrying capacities Adjust visitor numbers	Establish visitor carrying capacities Adjust visitor numbers	Establish visitor carrying capacities Adjust visitor numbers
	Visitor satisfaction levels with opportunities to experience park values and opportunities to view wildlife, scenery, and experience clean air and solitude	Visitors are highly satisfied (+90%) with their park experience				Moderate			

*High = Daily to weekly or in accordance with standard protocol for parameter; Moderate = Monthly to seasonally and during peak days or use periods; Low = Annually during peak use periods or at the end of the season.








Table 11. Adaptive management indicators, standards, methods by management zone, Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Parkway winter use plan.

Sensitive Resource Area Zone 9					
Resource Value	Indicator	Preliminary Standard	Method	Monitoring Intensity*	Management Actions
		All Alternatives			All Alternatives
Air Quality (Public Health)	Visibility	No degradation.	Photo survey and time lapse video Fixed site sampling of particulate matter (PM _{2.5} , and PM ₁₀)	Moderate	Evaluate success of closure
Wildlife	Wildlife harassment or displacement from habitat as a result of visitor activities	No incidents	Incident reports, photo surveys, and visual observations	High	Evaluate success of closure
	Human/grizzly bear conflicts during pre or post denning periods	No incidents	Incident reports, photo surveys and visual observations	High	Evaluate success of closure
	Lynx habitat effectiveness	No effects	Carnivore and snowshoe hare track surveys	High	Evaluate success of closure

*High = Daily to weekly or in accordance with standard protocol for parameter; Moderate = Monthly to seasonally and during peak days or use periods; Low = Annually during peak use periods or at the end of the season




Key

-  Destination/Support Area (Zone 1)
-  Plowed Road (Zone 2)
-  Groomed Motorized Route-Oversnow Mass Transit (Zone 3)
-  Groomed Motorized Trail-Oversnow Mass Transit (Zone 4)
-  Boundaries
-  Roads
-  Lakes

WINTER USE SEIS

Alternatives 1a & 1b



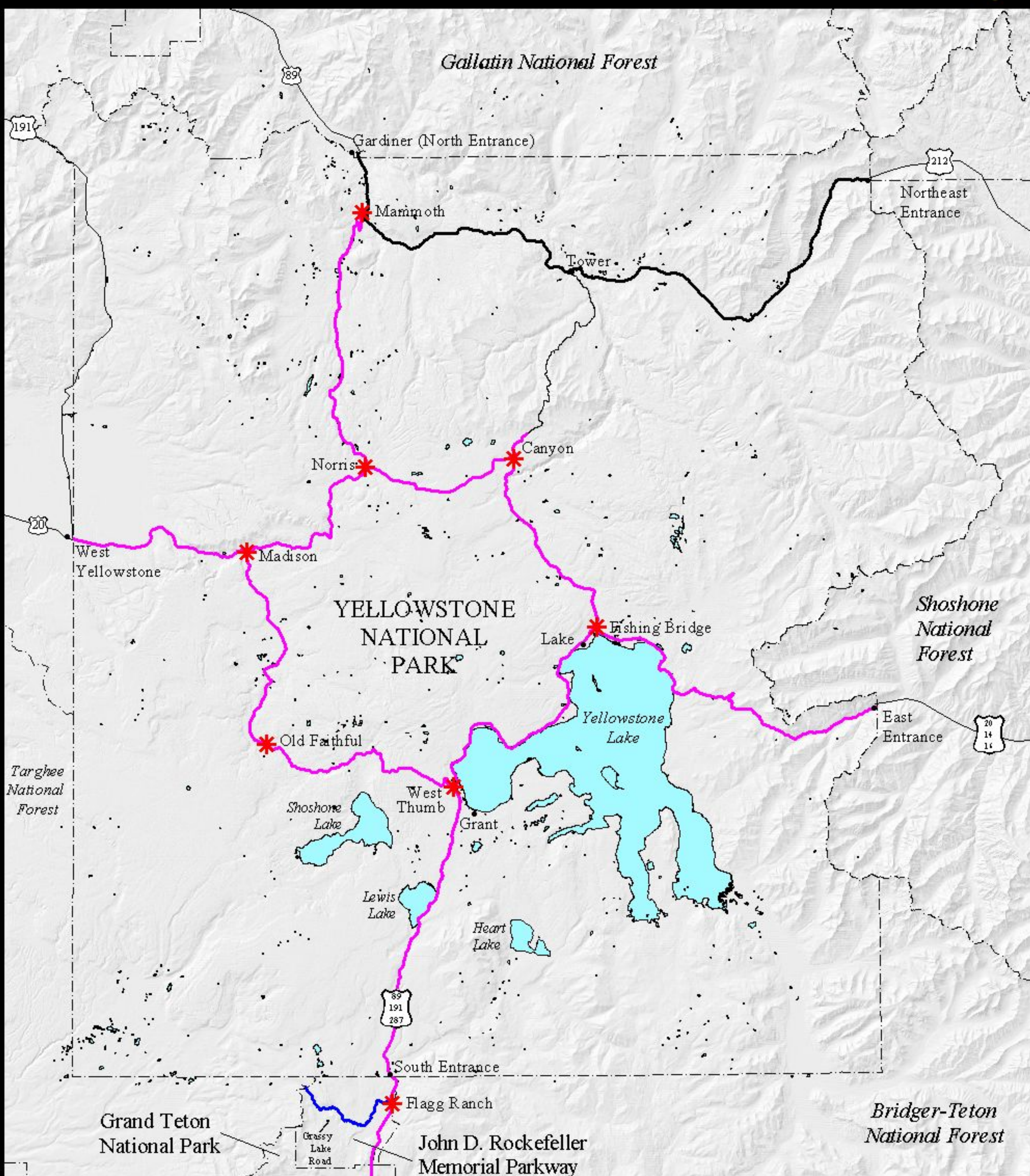
Grand Teton National Park and
John D. Rockefeller, Jr. Memorial Parkway
Wyoming, January 2002

50 Kilometers

50 Miles

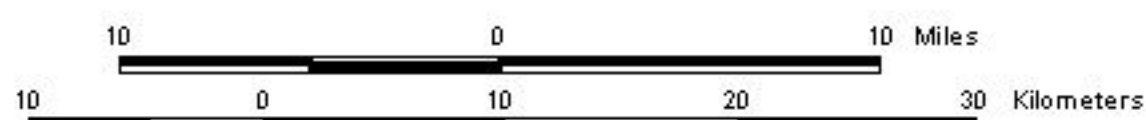
GRTE Geographic Data & Research Center

Figure 4



Key

- * Destination/Support Area (Zone 1)
- Plowed Road (Zone 2)
- Groomed Motorized Route-Over-snow Mass Transit (Zone 3)
- Groomed Motorized Trail-Over-snow Mass Transit (Zone 4)
- Boundaries
- Roads
- Lakes



GRTE Geographic Data & Research Center

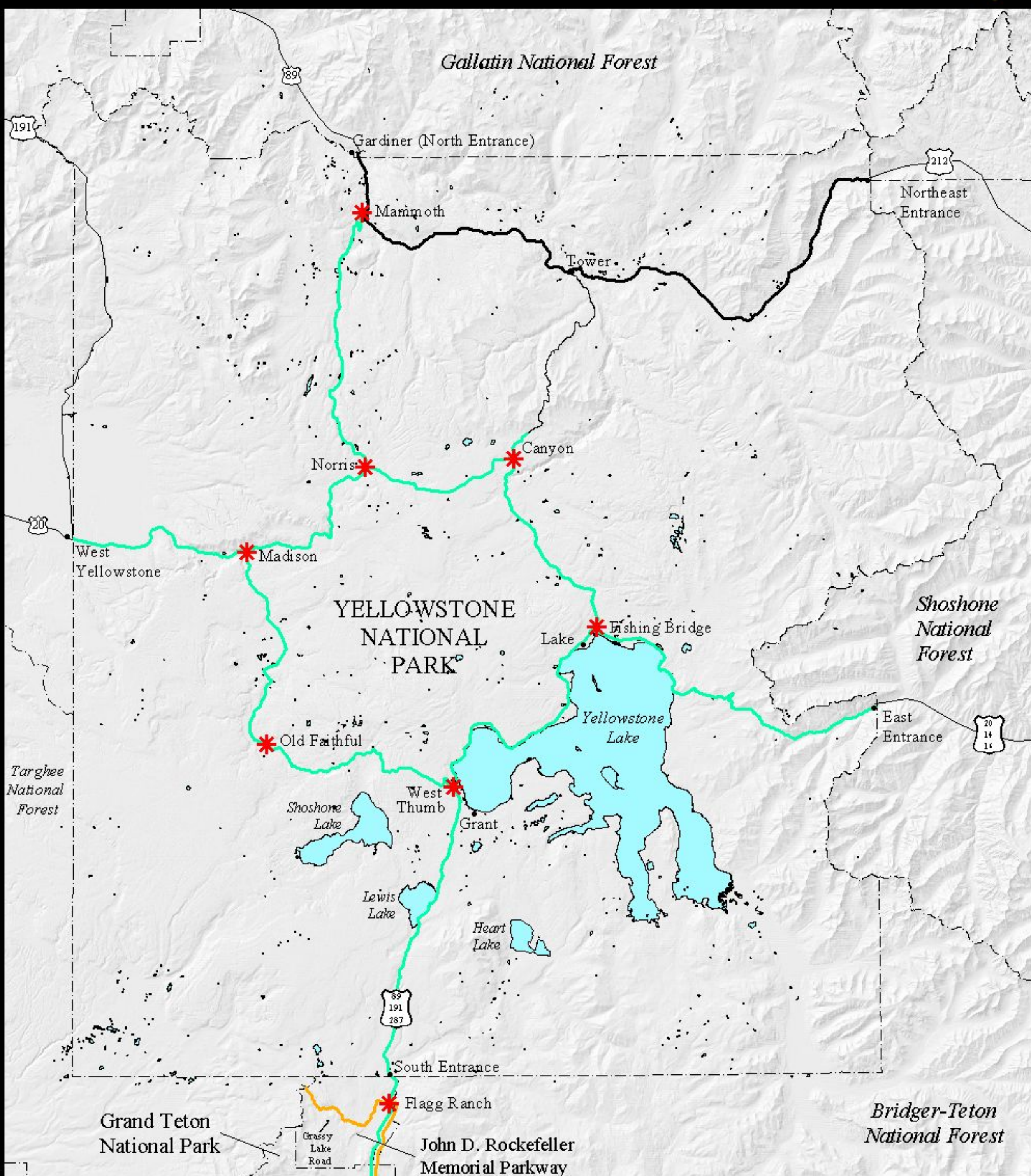
WINTER USE SEIS

Alternative 1a & 1b



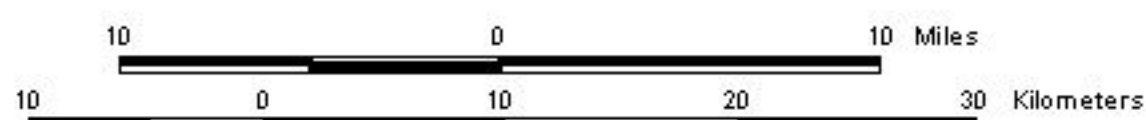
Yellowstone National Park
Wyoming, January 2002

Figure 2



Key

- ★ Destination/Support Area (Zone 1)
- Plowed Road (Zone 2)
- Groomed Motorized Route (Zone 3)
- Groomed Motorized Trail (Zone 4)
- Boundaries
- Roads
- Lakes



GRTE Geographic Data & Research Center

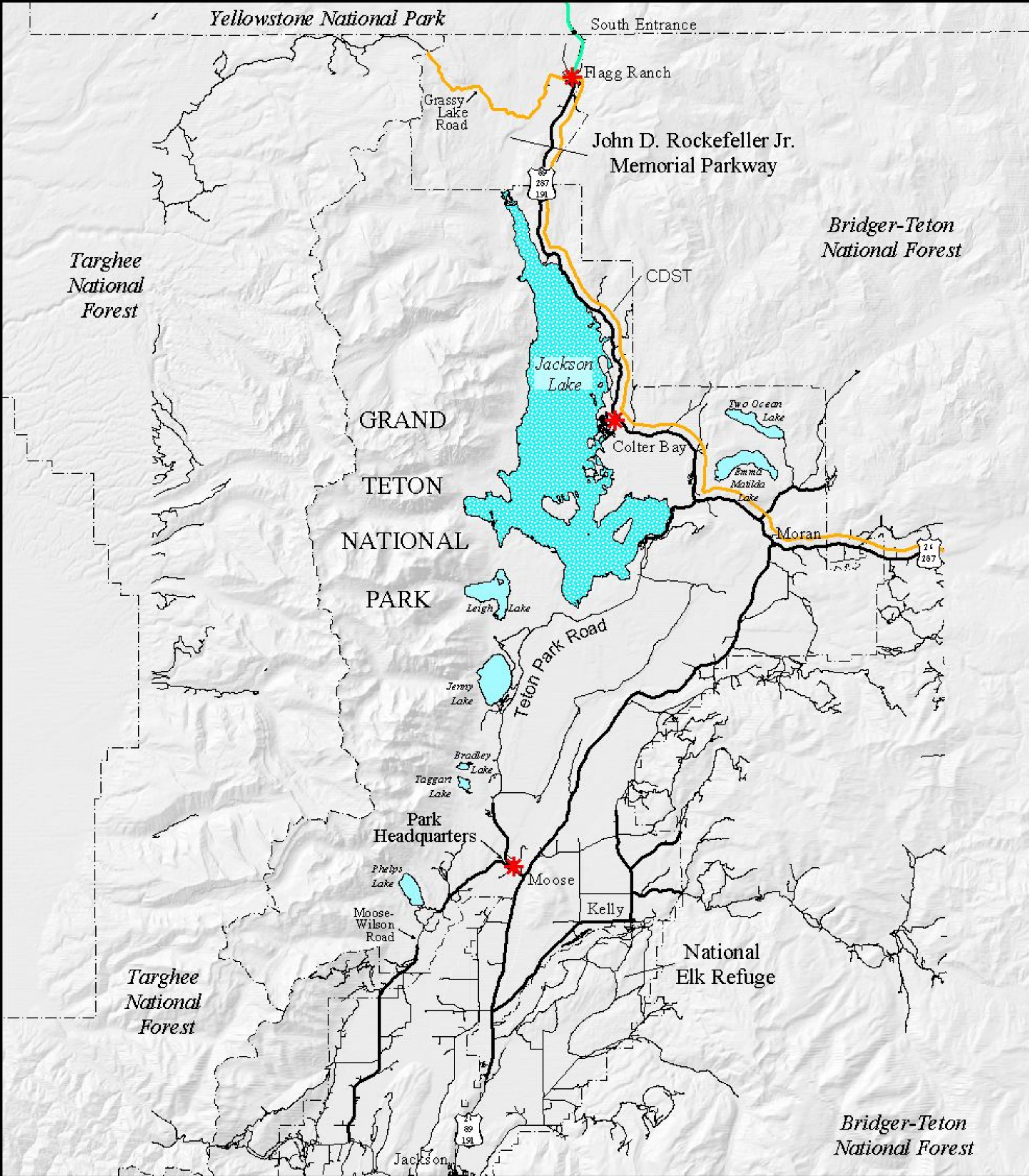
WINTER USE SEIS

Alternatives 2 & 3





Yellowstone National Park
Wyoming, January 2002


Figure 3





Key


 Destination/Support Area (Zone 1)


 Plowed Road (Zone 2)


 Groomed Motorized Route (Zone 3)


 Groomed Motorized Trail (Zone 4)


 Boundaries

 Roads

 Lakes

 Ungroomed Motorized Trail or Area (Jackson Lake)



0 5 10 15 Kilometers


0 5 10 Miles

GRTE Geographic Data & Research Center

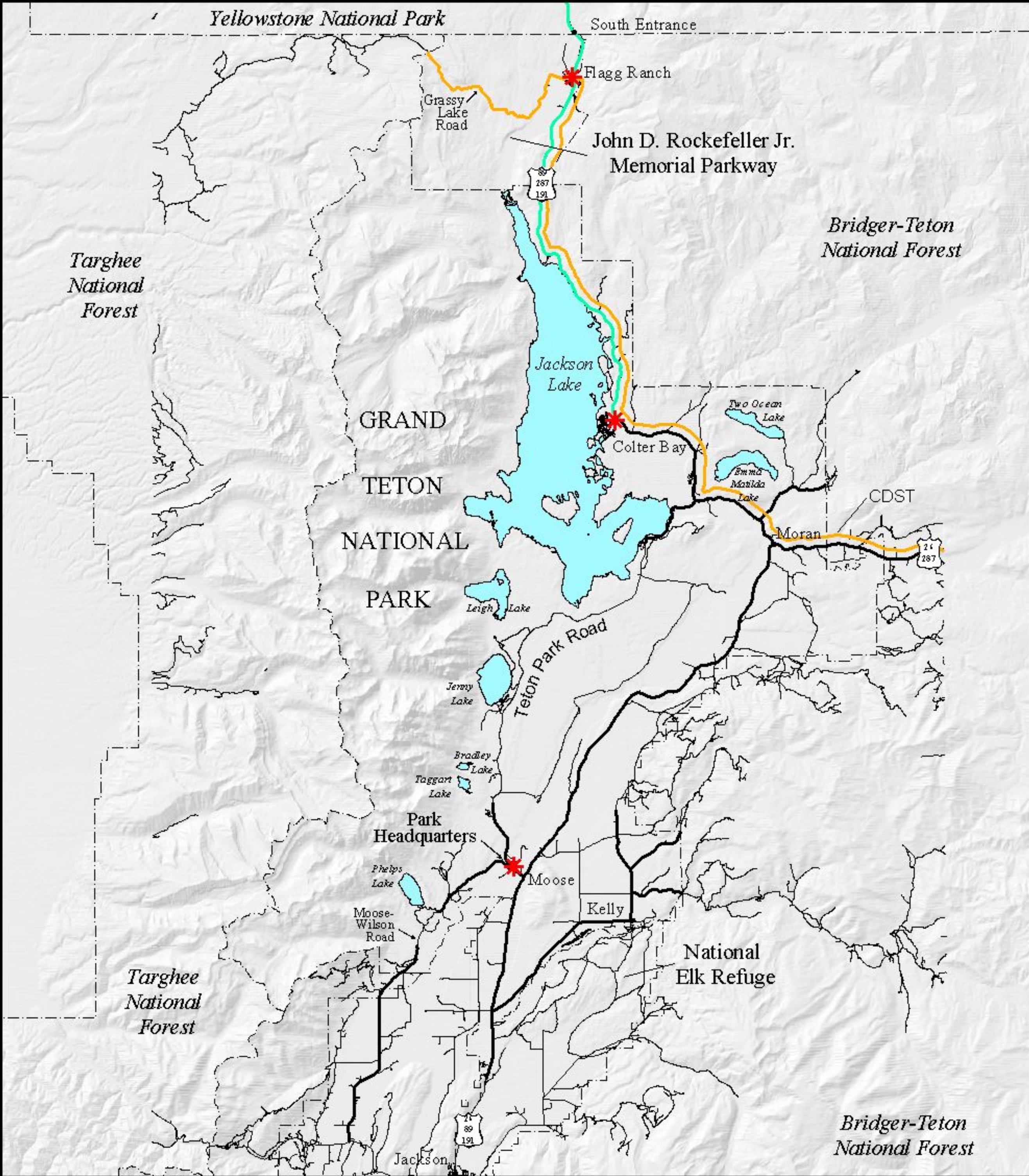
WINTER USE SEIS

Alternative 2










Grand Teton National Park and
John D. Rockefeller, Jr. Memorial Parkway
Wyoming, January 2002


Figure 5




Key

-  Destination/Support Area (Zone 1)
-  Plowed Road (Zone 2)
-  Groomed Motorized Route (Zone 3)
-  Groomed Motorized Trail (Zone 4)
-  Boundaries
-  Roads
-  Lakes

Note: Continue plowed access from Colter Bay to Flag Ranch until winter 2008/2009.



Kilometers


Miles

GRTE Geographic Data & Research Center

WINTER USE SEIS

Alternative 3



Grand Teton National Park and
John D. Rockefeller, Jr. Memorial Parkway
Wyoming, January 2002

Figure 6

CHAPTER III

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the environment of the area that could be affected by the alternatives being considered. Given the scope of the SEIS, much of the affected environment has already been described in the FEIS. Therefore, large portions of the FEIS affected environment are incorporated by reference, suitably referenced below. An effort has been made to focus only on those topics for which there is new information, with enough other discussion for convenience of the reader and for continuity with effects disclosed in Chapter IV.

In this chapter, mandatory EIS topics are reviewed with notations of their applicability in this process, and where they are discussed in either the FEIS (incorporated by reference) or the SEIS. New or updated information also presented in this chapter includes separate sections titled New Information Pursuant to SEIS Analysis, Park Service Operations, and Concession Winter Operations. These are not impact topics per se, rather they provide background context for the analysis.

MANDATORY TOPICS

CEQ regulations (40 CFR part 1500) and NPS policy (NPS DO-12) require that certain topics be addressed in every EIS. The FEIS, on pages 101-102, describes these mandatory topics with reference to the CFR, executive order, or other direction. The following table paraphrases the topic and references its disposition in either the FEIS or the SEIS.

Table 12. Disposition of mandatory impact topics.

Topic	Disposition	
	FEIS	SEIS
Possible conflicts between alternatives and land use plans, policies of other jurisdictions or agencies	See Direct, Indirect and Cumulative Effects on Adjacent Lands, p. 434	See Impact Topics Addressed in the SEIS
Energy requirements and conservation potential	Dismissed, page 101	See this chapter under the topic of National Park Operations
Natural or depletable resource requirements and conservation potential	Dismissed, page 101	Tier to FEIS

Topic	Disposition	
	FEIS	SEIS
Urban quality, historic and cultural resources	See Effects on Cultural Resources for each alternative in Chapter IV	See Additional Topics Dismissed in this SEIS
Socially or economically disadvantaged populations	See effects on Minority and Low Income Populations for each alternative in Chapter IV	See Additional Topics Dismissed in this SEIS
Wetlands and Floodplains	Floodplains dismissed, page 102. See Effects on Aquatic Resources for each alternative in Chapter IV	Tier to FEIS. See Additional Topics Dismissed in this SEIS
Prime and unique agricultural lands	Dismissed, page 102	Tier to FEIS
Endangered or threatened plants and animals	See Effects on Federally Protected Species for each alternative in Chapter IV	See Impact Topics Addressed in the SEIS
Important scientific, archeological and other cultural resources	See Effects on Natural Resources and Effects on Cultural Resources for each alternative in Chapter IV	See Additional Topics Dismissed in this SEIS
Ecologically critical areas, wild and scenic rivers, or other unique natural resources	Dismissed, page 102 and 106 except for topics associated with wildlife habitat	See Additional Topics Dismissed in this SEIS, and Impact Topics Addressed in the SEIS
Public health and safety	See Effects on Air Quality and Public Health, and Public Safety for each alternative in Chapter IV	See Impact Topics Addressed in the SEIS
Sacred sites and Indian Trust resources	See Effects on Cultural Resources for each alternative in Chapter IV	See Additional Topics Dismissed in this SEIS

IMPACT TOPICS DISMISSED

FEIS Topics Dismissed

A variety of impact topics were dismissed from extensive analysis in the FEIS. The FEIS, on pages 102-106 list the topics dismissed with a discussion of the rationale for doing so. The FEIS material is incorporated by reference into this SEIS. Topics dismissed are:

- Floodplains
- Black Bear (*Ursus americanus*)
- Mid-Sized Carnivores
- Subnivian Fauna
- Bullfrog (*Rana catesbeiana*)
- Birds
- Reptiles
- Exotic Species - Plants
- Exotic Species - Animals
- Mountain Goat (*Oreamnos americanus*)
- Vegetation

Additional Topics Dismissed in this SEIS

Additional impact topics are dismissed in the SEIS on the basis that the impacts have been disclosed in the FEIS, and no new information or alternative formulation results in impacts that would be any different. The decision to be made will not hinge on these topics relative to direct, indirect or cumulative impacts. Therefore, the following topics are dismissed from additional analysis in the SEIS, and the FEIS analyses are concurrently incorporated by reference as indicated in each discussion below.

Avalanche Hazards: Avalanche hazards are sufficiently described in the FEIS on pages 137-139 of the FEIS. Regardless of any alternative being considered, this hazard remains more or less constant. It remains within the discretion of NPS to institute measures at any time to protect public safety by closing areas to travel, by prohibiting stopping along some road segments, by prohibiting some uses, or other means that may be conceived on a case-by-case basis. Some alternatives in the SEIS might require more in the way of avalanche hazard mitigation because of certain visitor use features, but these situations have already been determined. Sylvan Pass is the avalanche area most at issue, because access through the East Entrance from Cody is involved. Frequent severe weather often necessitates closing the road to all visitation, sometimes for extended periods until storm cycles clear and control work can begin. Experience has shown that it is unsafe and unproductive to try to open the road during a winter storm. Avalanche control measures in place to facilitate winter access over Sylvan Pass are hazardous to employees who perform this function. This topic is being dismissed from further analysis, but mitigation is incorporated as needed, and the FEIS discussion is incorporated by reference.

Minority and Low Income Populations: This aspect of the social and economic analysis was demonstrated in the FEIS as something that did not vary significantly through the range of alternatives considering the relatively high cost of accessing the parks during the winter by any mode of transport. See FEIS Chapters III (page 113) and IV (pages 225, 272, 306, 333, 357, 379, 406). FEIS alternatives B and C offered the greatest potential for making winter access more affordable to low income populations. Overall, however, the demographic result associated with any alternative remains about the same in terms of income and ethnic background. Affordability of access remains a concern to be dealt with during the implementation of the plan, regardless of the programmatic outcome.

Cultural Resources: Through the entire range of alternatives evaluated in the FEIS, with the prescribed mitigation there would be not be any adverse effects on archeological or historic resources, ethnographic resources, cultural landscapes, sacred sites or Indian Trust resources. See the mitigation section in Chapter II of the SEIS, and FEIS Chapters III (pages 171-175) and IV (pages 265, 294, 326, 351, 372, 398, 427).

Geothermal Resources: Impact evaluation in the FEIS for most alternatives indicates that there are and would be minor adverse effects on the integrity of the geothermal resource itself as a result of winter use. The risks of impact may vary somewhat by alternative, left unmitigated. For the alternatives being further considered in this SEIS, there is essentially no greater potential impact than minor adverse impacts, which can be mitigated. See the mitigation section in Chapter II of the SEIS, and FEIS Chapters III (page 139) and IV (pages 229, 278, 310, 337, 360, 383, and 413).

Water and Aquatic Resources: Through the entire range of alternatives evaluated in the FEIS, there are no demonstrable adverse effects on water or aquatic resources based on existing information. Left unmitigated, the risks of impact may vary somewhat by alternative. For the alternatives being further considered in this SEIS, there is no potential for changes in the relative risks based on information about new technology. With any of the alternatives, application of a monitoring program and adaptive management represent appropriate protective actions regarding water and aquatic resources. See the mitigation and monitoring sections in Chapter I and Chapter II of the SEIS Alternative Features not Reevaluated in this SEIS, and FEIS Chapters III (pages 171-175) and IV (pages 230, 279, 311, 337, 361, 383, 414).

Wildlife and Uses Not Pertaining to Oversnow Motorized Access: Impacts unrelated to oversnow motorized use (e.g., wheeled vehicles, plowed roads, and nonmotorized recreation) are outside the scope of this SEIS. The evaluation of such impacts, by alternative, was analyzed in the FEIS and is incorporated by reference. See FEIS Chapter IV, pages 238-253, for a complete review under alternative A. Other FEIS alternatives compare and contrast effects to wildlife relative to alternative A. In regard to the effects of nonmotorized uses on wildlife, the existing decision closes or restricts areas to nonmotorized use where wildlife winter habitat concerns exist in the three park units. This aspect of the existing decision is not material in regard to new snowmobile technology, or to potential impacts of snowmobiles. Therefore, the analysis will not be revisited in the SEIS.

Ungulates Other Than Bison and Elk: Because 1) there is no new information on ungulate species other than bison and elk to report in the affected environment, and 2) no new impact are associated with the alternatives presented in the SEIS, the analysis of effects to these species disclosed in the FEIS is incorporated by reference. See FEIS, Chapter IV, pages 238-245 for a complete review under alternative A. Other FEIS alternatives compare and contrast effects to ungulate species relative to alternative A.

Wildlife Species of Special Concern: Regarding motorized and nonmotorized use, effects on species of special concern, the impacts of alternatives considered in this SEIS will not vary in scale from those disclosed in the FEIS. Mitigation measures, including monitoring and adaptive management, are incorporated into all the alternatives based on the FEIS analysis. Therefore, impacts on species of special concern are not reevaluated in this FEIS, but are incorporated by reference. See FEIS Chapter IV, pages 253 - 260, for a complete review under alternative A. Other alternatives compare and contrast effects on species of special concern relative to alternative A.

Federally Protected Species: Regarding motorized and nonmotorized use effects on federally listed species, the impacts considered in this SEIS will not vary in scale from those disclosed in the FEIS, and no new impacts are associated with any of the proposed alternatives. Mitigation measures, including monitoring and adaptive management, that are necessary to ensure there are no greater than negligible or minor adverse impacts are incorporated into all the alternatives based on the FEIS analysis. Furthermore, no new information on these species that would alter the assessment of effects is available. Therefore, impacts on these species are not reevaluated in the SEIS, but are incorporated by reference. See FEIS Chapter IV, pages 245-253, for a complete review under alternative A. Other FEIS alternatives compare and contrast effects on federally protected species relative to alternative A.

IMPACT TOPICS ADDRESSED IN THE SEIS

The impact topics that remain to be discussed are those relating to new information for which analysis may have altered the assessment of effects from that presented in the FEIS. For some impact topics, even though reported effects might be different, there may be no new information specific to that impact topic to present in the affected environment. For example, there may be no new information to discuss about visitor experience in the affected environment section. However, new technology or other means of mitigation in an SEIS alternative could result in impacts that are different from those disclosed in the FEIS. In instances such as this, information provided in the FEIS is incorporated by reference, and

summarized and referenced appropriately in the SEIS. A determination that there is no new information to report about a topic in the affected environment, and no new impacts that would vary by alternative in this analysis, would result in the dismissal of the topic from the SEIS.

Impact topics addressed in this chapter are listed below. New information or appropriate references are provided under each specific topic heading later in this chapter.

Table 13. Impact Topics Addressed in the SEIS.

TOPIC	FOCUS OF ADDITIONAL ANALYSIS
Socioeconomics	New economic information has been provided by the State of Wyoming. Some alternative provisions may allow a more refined analysis compared to the FEIS. See SEIS pages 97-103 and 150-166.
Air Quality and Public Health	Industry information about available “cleaner and quieter” snowmobiles, and additional information about snowcoach emissions and sound, may alter analysis of effects. Also, effects of interim limits on snowmobile use will vary by alternative in regard to this topic. See SEIS pages 107-115 and 174-206.
Public Safety	Effects of interim limits on snowmobile use will vary by alternative in regard to this topic. See SEIS pages 107-119 and 166-173.
Wildlife: Bison and Elk	Some alternative provisions may allow a more refined analysis compared to the FEIS, showing differences between alternatives. See SEIS pages 120-129 and 207-221.
Natural Soundscapes	Industry information about available “quieter” snowmobiles, and additional information about snowcoach sound, may alter analysis of effects. Also, effects of interim limits on snowmobile use will vary by alternative in regard to this topic. See SEIS pages 130-131 and 222 to 250.
Visitor Access and Circulation	Effects of interim limits on snowmobile use will vary by alternative in regard to this topic. See SEIS pages 132-135.
Visitor Use	Effects of interim limits on snowmobile use will vary by alternative in regard to this topic. See SEIS pages 135-138.
Visitor Experience	Industry information about available “cleaner and quieter” snowmobiles, and additional information about snowcoach emissions and sound, may alter analysis of effects. Also, effects of interim limits on snowmobile use will vary by alternative in regard to this topic. See SEIS pages 139-146.
Adjacent Lands	Effects of interim limits on snowmobile use varies marginally by alternative in regard to this topic. See SEIS pages 273-286.

NEW INFORMATION PURSUANT TO SEIS ANALYSIS

As presented in Chapter I, the scope of analysis is limited primarily to changes based on new information provided by ISMA regarding snowmobile technology. This is a function of the settlement agreement between ISMA and NPS. Subsequent to the settlement agreement, information has been submitted by ISMA and by others with the idea that the information would be of some use in the SEIS analysis. Below, following a discussion of the role of technology in the FEIS and the SEIS, a tabular presentation shows all information submitted. Included in the table is a summary assessment of the information in light of the scope of analysis and the settlement agreement. All submitted information was reviewed and considered. That which is most pertinent to the analysis is presented in SEIS Appendices C and D, either in full or as a summary. Assessments of the information by NPS are included in the administrative record.

In the FEIS, two alternatives presented objectives for development and use of oversnow motorized vehicles in regard to pollutant emissions and noise. These objectives were referred to in the alternatives using the descriptive shorthand terminology “clean and quiet.” In FEIS alternative B (FEIS page 42), where snowmobiles would be allowed, only snowmobiles that reduce hydrocarbon emissions 70%, carbon monoxide 40%, and particulates 75%, would have access into the parks¹. In terms of sound, only snowmobiles producing 70 decibels (dB) or less² would be allowed. Industry and local providers of machines would have until the winter of 2008-2009 to fully implement these provisions. Alternative D (FEIS page 48) would provide for the same reduction of emissions, but would further reduce the allowable decibel level to 60 dB, by 2008-2009. See table below for a comparison of unit standards relating to pollutant emissions and current technology.

¹ No increases in other pollutants would be allowed. The baseline for comparison is emissions from current 2-stroke machines.

² Measured on the A-weighted scale at 50 feet, running the machine at full throttle.

Table 14. Comparison of standards for pollutant emissions and current technology.

Standard Pollutant	FEIS Alternatives B, D (2008-2009) ³	EPA Proposed Standard (2010)	Arctic Cat [®] 4-stroke Machine (11/5/01 Model)
CO (g/kW-hr)	238.2	200	58.8
HC (g/kW-hr)	60.6	75	6.33
PM (ppm)	0.3	No standard	Not reported
Other	No increase	No standard	NOx: 19 g/kW-hr

In earlier comments from EPA, it is noted that these measures would not ensure adequate mitigation of impacts from pollution and noise without some attention to the number of machines that would be allowed, and without implementing the measures before 2008-2009. Other comments, subsequent to the FEIS, the decision and the publication of a rule, indicate that many who are opposed to closing the parks to snowmobiles are under the impression NPS did not consider new technology in making the decision. NPS did consider objectives that might be attained which would require the application of new technology. The approach is the same in this SEIS (i.e., objectives for pollutant and sound reduction as alternative descriptors) except that, relative to the settlement agreement, there is an indication from industry that it is capable of and intends on making machines available to reduce emissions and noise. The degree to which the reductions meet some objectives evaluated in the FEIS is the subject of this analysis. NPS was provided a letter written by Arctic Cat[®] to the State of Montana, which attests to the reliability and immediate availability, in unlimited quantities, of its cleaner and quieter 4-stroke snowmobile. This letter is contained in the administrative record for the SEIS.

The following table lists information submitted by ISMA and cooperating agencies, or by others acting in their behalf, that was contributed to the SEIS process. All the listed information was reviewed and considered for inclusion in the document or analysis as appropriate by NPS and by the analysts who are under contract to provide specific expertise.⁴ Based on this consideration and the date upon which the information was received, it was used to the extent possible in either the DSEIS or the analysis models for specific impact topics. As with any other information that is available, the decision-maker has the discretion to consider whether it is relevant within the scope of analysis, and to use the information as he or she desires.

³ Uses EPA baseline assumptions of 397 g/kW-hr for CO and 149 g/kW-hr for HC. Baseline for PM is from the FEIS.

⁴ Section 6 of the settlement agreement requires ISMA to provide new technology information to the park service by July 29, 2001. The concurrent agreement between NPS and Wyoming requires the state to provide new information by August 14.

Table 15. Listing of materials presented as new information, and a summary of how each was considered.

Materials Presented as New Information	Location of Information	Description of Information and its Use
ISMA Letter of Aug. 7 - Promotional material on 4-stroke snowmobiles.	DSEIS Appendix C	Letter submitted by ISMA to meet settlement agreement commitment. No data sufficient for changing emission/sound model inputs.
ISMA Letter of September 28 - Response to NPS letter of 9/10.	DSEIS Appendix C	Letter submitted by ISMA to meet settlement agreement commitment. No data sufficient for changing emission/sound model inputs.
ISMA Letter of October 9 - Emissions data on prototype 4-stroke snowmobiles	DSEIS Appendix C	Letter submitted by ISMA to meet settlement agreement commitment. Prototype information for HC and CO. No noise or particulates data.
ISMA Letter of November 8 - Data on production model 4-stroke snowmobiles	DSEIS Appendix C Model inputs Ch. IV Air	Letter submitted by ISMA to meet settlement agreement commitment. Production model information for HC and CO. No noise or particulates data provided.
"Determination of Snowcoach Emission Factors" (SwRI) 12/5. Provided by the State of Wyoming.	DSEIS Appendix D Model inputs Ch. IV Air	Information was considered, but not used in its entirety for the DSEIS due to lack of time. It will be reviewed further and used as revised model inputs for the FSEIS.
"American Voters Views on Snowmobiles in National Parks" (ISMA). Provided by the State of Wyoming.	Planning Record	Does not provide information on new snowmobile technology, and does not add to data for other analyses.
"The 2000-2001 Wyoming Snowmobile Survey" (UW). Provided by the State of WY.	DSEIS Chapter III, Summary in Appendix D	Information used to modify affected environment discussion for socioeconomics.
"Review of Research related to the Environmental Impact Statement for the Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr., Memorial Parkway" (Institute for Environment and Natural Resources, 2000). Provided by the State of Wyoming.	Planning Record	Information is not new. It was considered prior to the publication of a decision in Nov. 2000. It does not provide information on new snowmobile technology. It does not provide alternative methodologies, literature, or basic data that would lead to new conclusions (per 40CFR1503.3b).
"Review of Documents and Recommendations of the Winter Use Plans Final Environmental Impact Statement" (Western EcoSystems Technology, Inc. 2001. Provided by the State of Wyoming.	Planning Record	Does not provide information on new snowmobile technology. It does not provide information on alternative methodologies, literature, or basic data that would lead to new conclusions (per 40CFR1503.3b).
"Oversnow Vehicle Sound Level Measurements" 10/30. JHSI. Provided by the State of WY.	DSEIS Appendix D Model inputs Ch. IV Sound	Information was used to a degree, but not used in its entirety in the DSEIS considered, but not used for the DSEIS due to technical disagreement and lack of time. NPS and Wyoming agreed to perform more comprehensive sound

CHAPTER III
AFFECTED ENVIRONMENT

Materials Presented as New Information	Location of Information	Description of Information and its Use
		measurements for FSEIS in February 2002.
"An Expert Opinion on the Reasonableness of the Cooperating Agencies' Alternative #2 for Inclusion in the Yellowstone Winter Use SEIS" (Haas, 2001). Provided by the State of Wyoming.	Planning Record	Does not provide information on new snowmobile technology. Is used by Wyoming in developing the features of its "cooperating agency alternative" (alternative 2 in this SEIS).
Proposed EPA Rule. Provided by EPA.	Planning Record DSEIS Chapter III	Rule making is discussed in SEIS, along with EPA concerns regarding any SEIS assumptions based on the rule. Outcome of rule-making process is distant and uncertain.
"After-Market Improvement of 2-stroke Snowmobiles". Provided by Jerry Jardine, Dubois, WY.	DSEIS Appendix D	Supports concept that 2-stroke machines can be cleaner and quieter.
"Status and Potential of 2-stroke Technology in Montana" (MDEQ). Provided by the State of Montana.	DSEIS Appendix D	Supports concept that 2-stroke machines can be cleaner and quieter.
"Comparison of CO Emissions from Snowcoaches, 1997 and 2001 Snowmobiles, and 2001 Clean Snowmobile Challenge New Technology and Applications" (MDEQ). Provided by the State of MT.	DSEIS Appendix D	Supports concept that snowmobiles can be cleaner and quieter.
The Electric Snowmobile Demonstration Project. Provided by the State of Montana.	DSEIS Appendix D	Information, though interesting, is speculative and insufficient for analysis purposes.
"Society of Automotive Engineers 2001 Clean Snowmobile Challenge". Provided by the State of Montana and Teton County, WY	DSEIS Summary in Appendix D	Indicates that some FEIS alternative objectives could feasibly be met using both 2 and 4-stroke technologies. Does not reflect on production capability. May point to emerging best available technology.
MSU-Billings Poll. 12/6. Provided by the State of Montana.	Planning Record	Does not provide information on new snowmobile technology. Does not add to information about public preferences that already exists in the FEIS.
"Economic Importance of the Winter Season to Park County, Wyoming" (UW). Provided by the Park County, WY.	DSEIS Appendix D	Does not collect or evaluate new data and does not provide new input estimates that could be used in SEIS economic modeling.

PARK SERVICE WINTER OPERATIONS

The following discussion is intended to explain the details of administrative or other use of snowmobiles by NPS personnel, and it further supports measures that were included in the November 2000 Record of Decision.

Policy or Other Guidance

Executive Order (EO) 11644 (Use of Off-Road Vehicles on the Public Lands, section 1(3)(B)) specifically exempts “official use” of off-road vehicles. “Official use” means use by an employee, agent, or designated representative of the federal government or one of its contractors in the course of his or her employment, agency, or representation (Section 2(4)). EO Section 8 states the agency shall monitor the effects of the use of off-road vehicles on lands under their jurisdictions, and shall amend or rescind designations as necessary to further the policy of this executive order. Policy (8.2.3.2 Snowmobiles) states: “NPS administrative use of snowmobiles will be limited to what is necessary to manage public use of snowmobile routes and areas; to conduct emergency operations; and to accomplish essential maintenance, construction, and resource protection activities that cannot be accomplished reasonably by other means.” YNP and GTNP use of snowmobiles, as described below, are authorized under this direction. Such use should be dictated by need as expressed in the guidance. The parks have stated that use of such machines will follow policies on “minimum requirement” by reducing fleet size and by using technologies that minimize environmental effects (see ROD pages 3, 5, and 6 for measures the parks will implement).

Administrative Use

YNP had 106 administrative snowmobiles in its fleet in the winter of 2000-2001. Employees in all aspects of winter operations use the machines. The fleet includes Polaris Trail Touring, Sport Touring and Wide Track models. Typically one-quarter to one-third of the fleet is turned over each year, so that the snowmobiles are usually no more than four years old. On average, approximately 2,000 miles are put on each snowmobile annually. Some of the older machines, however, have more than 6,000 miles before they are sold at auction. The park’s goal is to operate its snowmobiles generally no more than two winters to minimize repair and maintenance issues and to ensure the health and safety of employees. However lack of overall funding of the winter operations has meant that this goal is never met, and some employees are using snowmobiles that are well beyond their optimum service life.

Approximately 16,076 gallons of gasoline are used, as well as about 1,170 gallons of lubricating oil. YNP's administrative snowmobile fleet has used synthetic, biodegradable oil for engine lubrication since the winter of 1995-1996. As of the winter of 2001-2002, the biodegradable 2-stroke oil that had been used for a number of winters was not available; the park is substituting other synthetic oils. The fleet has operated on a blend of unleaded gasoline and 10% ethanol since the winter of 1998-1999.

YNP purchased 31 four-stroke machines for the winter of 2001-2002 for use in its administrative fleet to both replace older two-stroke snowmobiles and add to the snowmobile fleet. The park bought a mix of Arctic Cat and Polaris machines to be able to test the operation of different snowmobiles. The park has used one brand of snowmobile (Polaris) exclusively for many years, for ease of parts inventories and maintenance consistency. The Arctic Cat four-stroke machines are production models in 2001-2002, whereas the Polaris is a prototype. In addition, for the winter of 2001-2002, the park purchased ten wide-track and higher performance snowmobiles for specialized uses within the park such as search and rescue and hauling heavier loads. The four-stroke snowmobiles cost between \$7,200 and \$7,600 each.

In addition to administrative snowmobiles, YNP operates 19 other oversnow vehicles. These include 8 groomers and 9 other tracked vehicles. The tracked vehicles include pickups, suburbans, an ambulance, and a van. For the winter of 2001-2002, two additional tracked ambulances will be in service to provide emergency medical response.

Goods and materials are also transported oversnow to support winter operations. Although all fuel and larger goods are transported to interior locations by wheeled vehicle before the start of the winter season, during the course of the winter, a large quantity of supplies are conveyed oversnow to support park personnel accomplishing their work in the winter.

Monitoring and Law Enforcement

Of the total use by YNP park staff, approximately 33 machines are assigned to the Resource and Visitor Protection Division. Many of these have been modified to include warning lights and decals so they are clearly identifiable as police vehicles, and they are used on road patrol in the winter. These machines put more miles on average than the balance of the park snowmobiles since they are used almost every day for longer-distance travel. Each winter, approximately 250 snowmobile-related tickets are issued.

Search and Rescue

YNP park staff responds to approximately 40 incidents each winter, including about 12 personal injury accidents and 14 search and rescue events. Of those search and rescue events, park staff are requested to assist outside agencies about six times each winter for searches outside park boundaries. Staff from the Resource and Visitor Protection Division accomplishes most of the search and rescue work, although all other park staff can be called on to assist in these events.

Personal Use by NPS Employees Living in the Park Interior

Approximately 94 permanent and seasonal employees and approximately 30 family members over-winter in the interior of Yellowstone National Park. The following table shows their distribution by location and work group. There are no employees of Grand Teton National Park or of the Parkway who presently are employed under these circumstances.

Table 16. Employees duty stationed in oversnow Yellowstone locations.

Work Group Location	Visitor Protection	Interpretation	Maintenance	Total
Old Faithful	8	5	11	24
Canyon Village	4	2	9	15
Lake	7	2	10	19
East Entrance	5	0	0	5
Madison	3	1	4	8
Grant Village	5	2	9	16
South Entrance	7	0	0	7
Total	39	12	43	94

When employees are offered employment in YNP, a condition of employment is that they must provide their own snowmobile for personal travel (for example, an October 2001 vacancy announcement for Engineering Equipment Operators stated, “During the winter, interior areas provide very limited services and are generally only accessible by snowmobile. A personal snowmobile is necessary for all personal use, i.e., for transportation in and out, and for food, supplies, and recreation.”)

Regulations regarding personal use of government property are found in 5 CFR 2635.704 Use of Government Property. Government vehicles, including snowmobiles, are government property and may not be used for unauthorized purposes. Personal use of a snowmobile is not considered an authorized purpose. Personal travel is defined as travel from their home for

purposes not related to official business. Examples of personal use include snowmobiling to a trailhead to ski on days off, snowmobiling to where their wheeled vehicle is parked so that they can grocery shop, or snowmobiling children to where their wheeled vehicle is parked so the children can go to school.

Historically, no restrictions have been placed on the type of snowmobiles that employees must use, and often snowmobiles are sold by departing employees to incoming staff. A number of seasonal park employees choose not to purchase a snowmobile for personal use and rely on others or do not travel out of the interior from late-November until late-March.

As stated in the FEIS, it is the park's intent to encourage employees to acquire environmentally friendly snowmobiles for their personal use. Achieving this goal will require either providing a fund source so that employees can purchase the snowmobiles for their use or authorizing personal use of government vehicles. The latter option would require a significant increase in the number of government-owned snowmobiles because many are shared by employees on the job. If a machine is taken out of service for personal use (such as on days off), another snowmobile must be available for the on-duty employee to use. Because of some of these issues, the Record of Decision on the FEIS stated a commitment to purchase administrative snowcoaches for employees' use. Federal agencies are authorized to provide mass transportation services to employees.

Concession Winter Operations

Considering the issue discussed above, relative to NPS use of snowmobiles, it is also appropriate to provide information about concessioner use of oversnow motorized vehicles in support of concession business. This use, as opposed to recreational use provided through concessions, may be viewed in the same context as NPS use, and therefore may also be considered at issue.

Policy or Other Guidance

Executive Order 11644 (Use of Off-Road Vehicles on the Public Lands, section 1(3)(C)) specifically exempts from the order any vehicle whose use is expressly authorized by the respective agency head under a permit, lease, license or contract. Concession contracts and operating plans can identify the need to use oversnow machines for administration of the business. Approval of contracts and plans could constitute authorization of these uses, being mindful of the same policies and guidance that governs NPS administrative use, and the need

for “minimum requirement” considerations. The following concession uses are deemed to be permitted under this guidance.

Concession Support Uses

Amfac Parks and Resorts uses 29 snowmobiles to support winter operations. During the winter of 2001 – 2002, Amfac is using the following snowmobiles for support use: 3 each 2002 Arctic Cat 4-stroke touring, 16 each 2002 Arctic Cat Panther 570 ESR, 8 each 2002 Arctic Cat Wide Track 550 and 2 each 2002 Yamaha – VK540EG. These snowmobiles travel a total of approximately 87,000 miles each winter and use approximately 5800 gallons of E-10 and 162 gallons of 2-stroke oil. In addition, Amfac typically uses two of its snowcoach fleet for administrative support (for example, for transporting laundry and supplies between Snow Lodge and Gardiner).

Yellowstone Park Service Stations has two snowmobiles (both 4-stroke for the 2001-2002 season) for administrative purposes, while the physician employed by Yellowstone Park Medical Services uses a park service snowmobile to access the interior. Hamilton Stores has no corporate snowmobiles; on occasion when winter access is required, personal machines are used.

Park guides and outfitters are also authorized to use snowmobiles and snowcoaches in the park for administrative access to repair or tow disabled vehicles.

Flagg Ranch reserves two snowmobiles for administrative use, though its operation is not dependent on this type of support. In the past, snowmobile use to support lodge operations has been rare. Flagg Ranch has the capability of using 4-cycle machines that have already been acquired. Ranch personnel state that if the road is not plowed (Highway 89/287 from Colter Bay to Flagg Ranch), two snowmachines would be needed by the winter caretaker. Grand Teton Lodge Company rarely uses snowmachines for administrative purposes, and to date only to access Jenny Lake Lodge to remove snow from roofs. The lodge company also use a gasoline-powered snowcat for this purpose, but would agree to use the cleanest, quietest machines. Two snowmobiles would likely be sufficient for this purpose. Triangle X Ranch maintains 6 snowmobiles, using 2-3 machines each day the ranch is open annually from December 26 to the end of March. The machines are used to transport guests’ luggage to cabins, and food to the lodge. They are also used to transport maintenance tools and materials, and to groom the nordic ski trail on the grounds. Signal Mountain Lodge does not operate during the winter, and does have any snowmachines.

Personal Use by Concession Employees Living in the Park Interior

Approximately 150 Amfac Parks and Resorts employees over-winter in the interior of the park. Amfac does not require that any of its employees provide their own snowmobile for personal travel. However, approximately ten employees own their own snowmobiles for personal travel. These employees use these snowmobiles to travel to and from the park interior a total of approximately 6,000 miles each winter season.

Yellowstone Park Service Stations also have two employees that over-winter in interior, and they are not required to provide their own snowmobiles for personal travel.

At present, there are no lodge company employees living in the interior of GTNP or the Parkway during the winter. Should the road not be plowed between Colter Bay and Flagg Ranch, suitable arrangements would need to be made for Flagg Ranch winter employees' personal needs.

SOCIOECONOMICS

Information in the affected environment section on socioeconomics in the FEIS is incorporated (along with all information sources cited) herein by reference. See FEIS pages 106-122. Topic summaries are presented below. It is supplemented by information derived from the 2000-2001 Wyoming Snowmobile Survey.

Regional Economy

The analysis area for the regional economy is a 5-county portion of the GYA. It includes the contiguous counties in Montana, Wyoming, and Idaho surrounding YNP, GTNP and the Parkway. The five counties are Fremont in Idaho; Gallatin and Park in Montana, and Park and Teton Counties in Wyoming. Most counties have an economic base dominated by tourism. Small communities adjacent to the park such as West Yellowstone, Gardiner, or Cooke City are highly dependent on park visitor spending, while larger communities (such as Bozeman, MT) derive a much smaller share of their economic activity from park visitor spending (a full discussion of this topic may be found on FEIS pages 106-109).

Income and Employment

The diversification of the economy in the GYA and the growth in the total number of jobs has helped keep unemployment in the five counties relatively low, at an average of 3.8% in 1997. A diversified blend of non-extractive industry sectors, including recreation, provides relatively stable employment base for the region. Most jobs pertaining to the recreation and tourism industry are found in the retail trade and services sectors of a county's economy. The recreation

and tourism sectors account for about 42% of the earnings in the 5-county area. Because of the world-renowned recreational resources available to the public within the GYA, these sectors are expected to continue to grow in importance (a full discussion of this topic may be found on FEIS pages 109-110).

Winter Recreation Sector

As stated in the FEIS, in the winter of 1998-99, YNP and GTNP visitors from outside Montana, Wyoming, and Idaho spent an average of \$1,129 during their trips. Of this amount, \$608 per person was reportedly spent in the GYA (Duffield and Neher 2000). Winter visitors to the park from within the GYA spend significantly less than out-of-state visitors, with \$210 per trip being spent within the GYA. The expenditure estimate for nonresident winter visitors from the 1999 winter visitor survey is similar to expenditure estimates from other studies.

The 2000-2001 Wyoming Snowmobile Survey provides an estimate by the state on economic inputs, reported here to provide the reader with information not available in the FEIS. Daily per person trip expenditures in Wyoming ranged from \$180.27 for outfitter clients to \$98.99 for nonresidents and \$68.50 for residents. Annual equipment expenditures in Wyoming ranged from \$2,306.13 for residents to \$329.94 for nonresidents, and \$64.11 for outfitter clients. The survey queried respondents (statewide) about behaviors that would result from a “ban” on snowmobile use in the parks. The state concludes from these data there could be a loss of up to 938 jobs, \$11.8 million in labor income, and \$1.3 million in government revenue in the state.⁵ This represents a very small fraction of the overall economic activity in the state and would not include the increases in economic activity to Montana, Idaho, Colorado, South Dakota and Utah due to the indicated increase in resident and outfitter client snowmobile trips to other regional trails.

In the context of the total GYA economy, expenditures by winter park visitors (and the additional economic activity that spending indirectly generates or induces) is a small portion of total GYA annual economic output. The direct, indirect, and induced expenditures generated in the GYA by nonresidents visiting the parks in the winter months are estimated at about \$63,000,000. In the context of the \$5.7 billion dollar annual output of the 5-county economy, this represents 1.1% of the total (Minnesota IMPLAN Group, County-level data 1996).

⁵ These figures are reported to contrast the state’s conclusions with NPS’ analysis of economic impacts. NPS submits these numbers significantly overstate potential impacts. The planning record contains rationale for NPS’ determination.

The statewide survey of snowmobiling (2000-2001) cited earlier was prepared by the Department of Agriculture and Applied Economics at the University of Wyoming. It was sponsored by The Wyoming Department of State Parks and Historic Sites, the University of Wyoming, and the Wyoming State Snowmobile Association.⁶ The survey process was designed to collect information on trail usage, expenditures, and user satisfaction for snowmobiling in the State of Wyoming. A sample of 1,019 nonresidents and 1,073 residents with registered snowmobiles were chosen randomly from the total Wyoming State Trail Program database. Respondents for the outfitter client survey were gathered with assistance from 22 of the 39 outfitters with registered commercial snowmobiles. Of the 326 returned outfitter client surveys, 277 were useable. Twenty of the 39 registered outfitters (representing 71% of the registered commercial snowmobiles in the state) participated in the snowmobile outfitter interviews. An executive summary of the report may be found in Appendix D. The reports describe methods and results in greater volume than can effectively be summarized in this SEIS.

Information in the survey includes the following. Snowmobile outfitters depend on snowmobile rental and guiding for about 92% of their winter business, and 70% of their total annual business. Average fleet size for an outfitter is 36 snowmobiles, with holidays and the month of February being their busiest times. The majority of clients come from outside Wyoming, and their numbers have increased 100% in the past four years. Use by outfitters in national parks comprises 23% of their business. Most outfitters (85%) feel that the decision to ban snowmobiles in YNP is unfair because they thought NPS did not adequately consider how it would affect their business. Thirty-five percent felt the ban was a "Clinton /environmentalist" agenda, and 25% are concerned how the ban would affect national forests or that forests would follow suit and ban use. Half the outfitters did not plan on making any changes to their businesses as a result of the ban, while others would plan on shifting more use to national forests and state trails. Forty-five percent of outfitters' preferred solution to the "snowmobile conflict within YNP" is to leave the situation as it was before the ban. The second most preferred solution (again, 45%) is to limit the number of snowmobiles per day or per season. The third highest-ranked answer, selected by 70% of the outfitters, is to require cleaner and quieter snowmobiles. Outfitters are concerned about the cost and performance of such machines (for example, they are slower and heavier than their clients desire). Other concerns are the potential for future bans and overcrowded state trails.

⁶ McManus, Coupal and Taylor, August 2001

The survey cites that most clients do not own their own snowmobiles, and nearly half had snowmobiles one year or less in Wyoming. Over 60% of clients traveled more than 1,000 miles (one way) during the past season. Most do not belong to snowmobile clubs. Fifty-six percent agree with the need for a cleaner and quieter snowmobile, and 64% are willing to pay more to use one. During the past season, the clients responding to the survey came to Wyoming for 72% of their trips, using state trails one third of the time and YNP or GTNP another third of the time. In terms of snowmobile-days, 63% were spent in Wyoming, with 35% on state trails and 27% on GTNP or YNP.

From the Wyoming survey, 57% of clients would change the number of trips made to Wyoming if they were no longer able to snowmobile in the parks, and 95% of these would decrease the number of trips. If snowmobiles were banned from YNP or GTNP, outfitter clients would decrease their total snowmobile trips by nearly 35%. Snowmobile trips to Wyoming by outfitter clients would decrease by over 52%. Trips to state snowmobile trails would decrease by 11% and to other Wyoming trails by 14%, indicating little substitution between sites. The results show some substitution to other parts of the region, with the number of trips increasing by nearly 21%, however there would be a net loss in total snowmobile days by clients both in total and in Wyoming. About 85% of outfitter clients would not be willing to consider going to YNP if the only mechanized access were by snowcoach, and 15% would consider using a snow coach.

The results from the 2000-2001 Wyoming Snowmobile Survey provides new information on trail usage, expenditure information and user satisfaction for snowmobiling in the State of Wyoming. The results represent resident, nonresident, and outfitter client snowmobile use of Wyoming State trails during the season of 2000-2001. Trips to YNP and GTNP trails accounted for 3.1% of resident, 4.6% of nonresident, and 33.2% of outfitter client snowmobile trips during the season. Much of the analysis contained in the FEIS is supported by data collected from winter visitors to the parks who were surveyed regarding their winter trips to the GYA. The economic impact analysis for the FEIS specifically focused on changes in winter visits to the GYA area and the resulting impact on the 3-state and 5-county level. Statewide information contained in the Wyoming survey is somewhat beyond the scope, or is not directly comparable to the FEIS analysis.

Snow condition ranked as the most important natural feature for choosing a Wyoming snowmobile area among nonresident and resident snowmobilers, with 80.8% of nonresidents and 63.8% of residents rating this aspect in the top three natural features. The two other

natural features that most attracted nonresident and resident survey respondents were off-trail powder areas and scenic views. Wildlife viewing was ranked as a top natural trail feature by 19.6% of resident respondents and 12.7% of nonresidents. Scenery, snow conditions, and reputation for snowmobiling were the most important factors for outfitter clients in the decision to snowmobile in Wyoming (see the *Visitor Experience* section later in this chapter).

The preferred solutions for "resolving the snowmobile conflict in national parks" as indicated in the 2000-2001 Wyoming Snowmobile Survey are presented in greater detail in the visitor experience section. Briefly, the majority of residents (nearly 70%) prefer that there would be no ban on snowmobiles. Half of these prefer a requirement for cleaner and quieter machines, and half want no additional requirements. About 20% of resident snowmobilers prefer a solution that limited snowmobile access by day or by season. Over 37% of nonresident respondents prefer no ban and no additional requirements. As a solution, 28% favor cleaner and quieter machines, and almost 30% favor either a partial ban in highly sensitive areas or more limited access by day or by season.

Half of resident Wyoming snowmobilers did not see a need for cleaner and quieter snowmobiles but 50% also said they would pay more to use them if these vehicles were available. A minority of nonresidents (28.2%) thought there was a need for cleaner and quieter snowmobiles, but 50.5% of all respondents said they would pay more to use them if these vehicles were available. A majority of outfitter clients (56%) thought there was a need for cleaner and quieter snowmobiles and over 64% said they would be willing to pay a higher price to use them.

Snowmobile Expenditures in Wyoming

The Wyoming snowmobile survey states that over 78% of outfitter clients, 89% of residents and 97.3% of nonresidents indicated that snowmobiling was their primary purpose for traveling to Wyoming during their most recent visit. Trips to YNP and GTNP accounted for 3.1% of resident, 4.6% of nonresident, and 33.2% of outfitter client snowmobile trips during the 2000-2001 season.

Outfitter clients would make the most changes of all Wyoming trail users if YNP and GTNP were closed to snowmobile access; nonresidents and residents would also be affected but to a lesser degree. Resident, nonresident and outfitter clients indicated they would decrease their annual overall total number of snowmobiling trips by 2.5%, 11.4%, and 34% respectively. Resident, nonresident and outfitter clients indicated they would decrease their annual

snowmobiling trips to Wyoming trails by 5%, 10.4%, and 52.3% respectively. However, the survey results do indicate some substitution to other trails within the region (MT, ID, CO, SD, and UT) with the number of resident trips increasing by 52.1% and outfitter client trips increasing by 20.6%. Nonresident snowmobilers indicated their use to other regional trails would decrease by 10.4%. The majority of Wyoming snowmobile trail users (84.6% of outfitter clients, 91.2% of residents, and 93.2% of nonresidents) would not consider going to YNP if their only mechanized access were by snowcoach tours.

Park Visitors

The survey results from the 2000-2001 Wyoming Snowmobile survey are, for the most, part consistent with the other survey results concerning the snowmobile experience discussed in Chapter III of the FEIS (pages 190-196). Small differences in the importance ranking of solitude and wildlife viewing are noted and may be due to the expected differences between a statewide recreation survey and park specific survey. Based on an evaluation of the survey results discussed in this chapter and in the FEIS, the most important aspects of visitor experience that relate to winter use plans for the national parks are the following.

- Opportunities to view wildlife
- Opportunities to view scenery
- The safe behavior of others
- Quality of the groomed surface
- Availability of access to winter activities or experiences
- Availability of information
- Quiet and solitude
- Clean air

More detailed discussions of these items may be found in the visitor experience section later in this chapter.

Some notable results from the Wyoming Snowmobile survey in regard to park use are as follows. Wyoming outfitter clients and nonresident and resident snowmobilers were satisfied or very satisfied with snowmobiling in Wyoming (98%, 97%, and 96% respectively). Residents and nonresidents indicated that the availability of parking was a concern. Nonresidents were also concerned with the availability of shelters, trail signing, trail maintenance and trail grooming. Over 79% of outfitter clients, 58.9% of residents, and 54.2% of nonresident snowmobilers had made a snowmobiling trip YNP at some point in their lives. YNP was ranked as the fifth most preferred Wyoming trail area for residents and nonresidents (24.7% and 27.8%, respectively). GTNP was ranked as the seventh most preferred Wyoming

trail area by nonresidents (15.5%) but was not ranked among the top ten preferred state trail areas by residents. Over 58% of outfitter clients indicated that the recent publicity regarding closing Yellowstone to snowmobiling access had encouraged them to snowmobile in Wyoming.

In 1999, winter visitors to YNP and GTNP were surveyed regarding their winter trips to the GYA, and their opinions about winter management of the national parks in the GYA. Respondents to the survey were asked what activities they participated in during their visits to the parks. Overall, 73.6% of park respondents reported snowmobiling, 10% reported riding a snowcoach, and 22.1% reported cross-country skiing as one of the activities participated in during their visit to the GYA. There were a significant number of people in the sample who reported participating in a combination of activities, for example snowmobiling and cross-country skiing, or riding a snowcoach and cross-country skiing. The survey found that the reported median household income for winter visitors was between \$60,000 and \$75,000 per year. The income level of winter visitors to the GYA varied greatly depending on where the visitor lived. Other survey conclusions: almost all the winter recreation visitors in the GYA are white (99.0%) and male (66%). This compares to summer visitors where 98% are white and 50% are male (a full discussion of this topic may be found on FEIS pages 111-114).

Social Values

The general public has strongly held and divergent values and opinions on public policy issues concerning winter management of YNP and GTNP. The following description is summarized from survey data and analysis performed by Duffield, et al., cited and discussed in the FEIS. Current winter visitors to YNP generally prefer the previous policy of grooming roads for snowmobile use. Among the general public, the local population was evenly divided between keeping the previous policy or allowing snowcoaches, ski and snowshoe access only. However, the regional and national populations preferred the snowcoach only option. Among national respondents there was also substantial support for allowing only skiing and snowshoeing. In general, visitors would like mechanized access into YNP in the winter. However, visitors are also concerned about wildlife and possibly other resource impacts. When faced with a specific choice (for example, help protect bison versus mechanized access), it appears that a majority of the public is willing to accept major changes in access policy.

A telephone survey undertaken in 1998 for Teton County, WY (Morey and Associates, Inc.) collected information on local resident winter participation and attitudes. The study found that

21% of households snowmobiled and 15% cross-country skied in Yellowstone in the winter of 97-98. In their usage of GTNP, 12% of residents snowmobiled, 46% cross-country or back-country skied, and 10% used snowshoes. A total of 52% of Yellowstone users and 56% of non-users feel snowmobiles negatively impact Yellowstone in the winter.⁷ Of these, 66% feel they are too noisy, 44% feel they affect air quality, 39% feel they disturb wildlife, and 25% feel there are too many. A total of 51% of users and 61% of nonusers feel that there should be admittance limitations in Yellowstone during the winter on snowmobiles. The survey also found that 7% of all respondents derive income from winter use in YNP or GTNP (discussion of this topic may be found on FEIS pages 115-121).

AIR QUALITY AND AIR QUALITY RELATED VALUES

Discussion of air quality and public health may be found on FEIS pages 123-128. The FEIS discusses existing concerns and information about snowmobile emissions. It presents a regulatory overview, National Ambient Air Quality Standards, and data from air quality monitoring programs. This information, incorporated by reference into this SEIS, is briefly summarized here. Additional information is reported under new research and EPA proposed rule. Over the past ten years, increases in the number of visitors using snowmobiles in YNP and GTNP have intensified concerns regarding air pollution and its effects on the health of park employees, visitors, and operators and riders of snowmobiles. A 2-stroke engine that provides a high power/weight ratio powers the typical snowmobile, and these engines produce relatively high emissions of carbon monoxide (CO) and unburned hydrocarbons (HC) compared to modern automobile engines. They also do not incorporate pollution control equipment. At the present time, there are no federal laws regulating snowmobile engine exhaust emissions⁸. CO is a colorless, odorless, and poisonous gas produced by incomplete burning of carbon in fuels. When CO enters the bloodstream, it reduces the delivery of oxygen to the body's organs and tissues. Health effects range from impairment of visual perception, manual dexterity, learning ability, and performance of complex tasks; to headaches and fatigue; to respiratory failure and death.

In addition to CO emissions, snowmobiles generate particulate matter (PM) and volatile organic compounds (VOCs). VOCs include air toxics or hazardous air pollutants such as benzene and formaldehyde. PM includes dust, dirt, soot, smoke, and liquid droplets directly

⁷ Teton County indicates that this statistic was derived from the nonmotorized user group, not the entire sample population.

⁸ EPA released a draft rule, which proposes to regulate snowmobile emissions, in September 2001. A final regulation is expected by September 2002. See discussion of the EPA proposed rule in this section.

emitted into the air by sources such as power plants, vehicles, construction activity, fires and natural windblown dust. Vehicle exhaust PM emissions also contain hazardous air pollutants such as 1,3-butadiene. Health effects from PM emissions include reduced lung function, aggravation of respiratory ailments, long-term risk of increased cancer rates, and development of respiratory problems. Snowmobile emissions have been the source of the vehicle emission and health related complaints in YNP.

YNP and GTNP are classified as mandatory Class I areas under the Federal Clean Air Act (42 USC 7401 *et seq.*). This most stringent air quality classification is aimed at protecting parks and wilderness areas from air quality degradation. The act gives federal land managers the responsibility for protecting air quality and related values. The Federal Clean Air Act, as amended in 1990, requires the EPA to establish national ambient air quality standards (NAAQS) to protect public health and welfare. Standards have been set for six pollutants: particulate matter less than 10 microns (PM₁₀), carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO₂), ozone (O₃), and lead (Pb). These pollutants are called criteria pollutants because the standards satisfy criteria specified in the act. Table 28 in the FEIS (page 125) presents the standards for criteria pollutants, as purveyed under federal and state jurisdictions. The states of Montana and Wyoming have adopted more stringent standards for some pollutants. It should be made clear that jurisdiction for enforcement of NAAQS standards is delegated to the states. This is in contrast to the affirmative responsibility that lies with the federal land manager in the Clean Air Act to protect air quality and air quality related values (including visibility). Moreover, it is evident that the federal land manager has the authority and jurisdiction to manage activities within park boundaries that impact park air quality and air quality related values.

New Research

A research paper Snowmobile Contributions to Mobile Source Emissions in Yellowstone National Park was published in *Environmental Science and Technology* on the Worldwide Web June 7, 2001.⁹ The highly technical article presents its study methods, data, data sources, and results in modeling HC, CO and toluene emissions from snowmobiles entering Yellowstone National Park. The abstract concludes, in part, that snowmobiles account for 27% of the annual emissions of CO and 77% of annual emissions of HC using an equivalent best estimate for summer mobile source emissions. It states that use of oxygenated fuels in snowmobiles reduces CO emissions by about 13% (+ or – 6.5%), but produces no change in

⁹ Authored by Bishop, et al. Department of Chemistry, University of Denver, Denver, CO. in Vol.35, NO.14, 2001.

HC emissions. Also, it reports that liquid-cooled snowmobiles have higher HC emissions than fan-cooled machines by about 7 to 11%. On the concluding page of the article, authors state: “The large differences in emission rates between the over-the-snow vehicles and the on-road vehicles is balanced by the large excess of fuel which is consumed in the park during the summer. However, the difference in HC emissions speaks to the need for the snowmobile industry to move away from 2-stroke designs to more fuel efficient 4-stroke engines.”

EPA Proposed Rule

On December 7, 2000, EPA published several findings in the Federal Register in its advanced notice of proposed rule making. Among others, EPA found “that all land-based recreational nonroad spark-ignition engines....cause or contribute to air quality nonattainment in more than one ozone or carbon monoxide nonattainment area. We also find that particulate matter emissions from these engines cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare.” The reference to recreational vehicles includes snowmobiles. The finding also notes that recreational vehicles currently contribute about 8% of HC emissions and 5% of CO emissions from all mobile sources, which includes autos, trucks, trains, and buses.

On October 5, 2001 EPA published in the Federal Register proposed emission standards for several groups of nonroad engines that cause or contribute to air pollution, but that have yet to be regulated by EPA. This class of engines includes snowmobiles. The proposed regulation in its entirety and the supporting documents can be found at www.epa.gov/otaq/recveh.htm or by obtaining a copy of the 10/5/2001 Federal Register. The publication of the *Final* Emission Regulation is expected by September 13, 2002.

In brief, EPA’s proposed regulation would require snowmobile manufacturers to reduce emissions across their production fleets starting in 2006. The proposal would require reduced carbon monoxide (CO) and hydrocarbon emissions (HC) from new machines in two phases. Phase I, starting in 2006, would require reduced emissions of CO and HC in new machines by 30% from today’s baseline. Phase II, starting in 2010, would require reduced emissions of CO and HC in new machines by 50% from today’s baseline.

Table 15. EPA's proposed emission standards for snowmobile engines.

	Carbon Monoxide (g/kW-hr)	Hydrocarbons (g/kW-hr)
EPA Baseline	~ 400	~ 150
Phase I Standard Effective 2006 (reduction from baseline)	280 (30%)	105 (30%)
EPA Blue Sky	120	45
Phase II Standard Effective 2010 (reduction from baseline)	200 (50%)	75 (50%)

Fleet Averaging

EPA has proposed that these standards be implemented as “fleet averaged” standards. Fleet averaging means that each manufacturer’s production fleet would, on average, have to meet these emission reductions. In other words, a manufacturer could produce some machines whose emissions were worse than the standard, as long as that same manufacturer produced an equal number of machines with emissions that are that much better than the standard. EPA has proposed a detailed methodology and enforcement mechanisms to ensure that no manufacturers fleets will, on average, exceed the standard.

Noise

The proposed standard does not include any regulation of sound or noise from this class of engines.

Analysis and Implementation Issues Regarding EPA's Regulation of Emissions

EPA states that any analysis of impacts regarding air quality, or how the proposed regulation is viewed as a factor in the analysis, should incorporate several considerations. These are:

- EPA’s regulation of snowmobile emissions is in the proposal phase. EPA is taking public and industry comment on this proposal, and attempting to address concerns expressed by the Office of Management and Budget. Virtually any aspect of the proposal could change in the final regulation due out in September, 2002.
- The fleet averaging provision will complicate NPS’ analysis of the effects of the proposed standard. First, not all machines produced after 2006 or 2010 will meet the standard. High powered mountain, powder and hill climbing snowmobiles would be most likely to exceed the emissions standard. It is not easy to predict what percentage of machines will exceed the emissions standard, or by how much they will exceed it. There is no labeling requirement incorporated in EPA’s proposed regulation that would allow NPS to easily identify those machines certified as meeting the emission standard.
- All existing snowmobiles will be “grandfathered” into the regulation, meaning only new machines will be required to comply with the regulation. Therefore, there will be a period of time between the promulgation of the regulation and when the public fleet

of snowmobiles will, on average, reduce emissions equivalent to the regulated reductions. The ISMA has estimated the average life of a snowmobile at approximately nine years.

PUBLIC HEALTH AND SAFETY

Discussion of public health and safety in relation to winter use may be found in the FEIS on pages 123-139. Information provided below has been updated to incorporate public safety data obtained during the winter of 2000-2001. The FEIS discussion of air quality and public health (FEIS page 123) is fully incorporated by reference and not summarized or repeated here. NAAQS pollutants that affect public health are evaluated by alternative in the effects analysis. Levels of those pollutants represent an index to public health.

Public Health

Elevated levels of air pollution affect public health. The promulgation of NAAQS standards was specifically for the purpose of addressing the effects of air pollution on public health. The reader is referred to the previous section on air quality in which the effects of air pollutants on health are summarized.

Public Safety

Case Incident Reports—YNP

Rangers complete Case Incident Reports (CIRs) when they have been summoned to a specific location (Table 32). The content of the CIRs during the winter season vary widely; for example, they can report visitor assists for gasoline sales and snowmobile repairs, search-and-rescue assistance to other area agencies, or the presentation of a talk to a group of people. YNP compiled a draft report on CIRs involving winter recreationists in YNP and outside the park for which park rangers' assistance was requested for the period December 1995 to March 2001 (Wondrak 1998, rev. 1999, 2000, and 2001). The report covered CIRs that related to winter recreationists participating in snowmobiling, snowcoach riding, skiing, and hiking. Other winter recreational activities such as snowboarding, sledding, ice skating, and snowshoeing are conducted in YNP during the winter, but there were no CIRs associated with these activities in the seasons covered by the report. During the five winter seasons (1995-2001), about 384 (90%) of the CIRs involved snowmobiles (snowmobiles account for 62% of overall winter use). One CIR involved hikers, twenty CIRs involved skiers and twenty

involved snowcoach riders. The following table contains an accounting of the incidents by activity type.¹⁰

Table 16. Case incident reports from December-March 1995-2001.

Hiking Use	
Incident Description	Total Frequency
Agency Assist	1

Skiing Use					
Incident Description	Agency Assist	Avalanche Death	Search & Rescue	Visitor Assist	Misc.
Total Frequency	1	2	12	4	1

Snowcoaches		
Incident Description	Entering Closed Area	Visitor Vehicle Assistance
Total Frequency	1	19

Snowmobile Use	
Incident Description	Total Frequency
Abandoned	3
Agency Assist	51
Suspended License	3
Death	1
DUI	8
Entering Closed Area	19
Excessive Noise	3
Off-road Travel	12
Search & Rescue	4
Suspected Intrusion	9
Speeding	8
Unlicensed Driver	12
Unsafe Operation	7
Visitor Assist	222
Miscellaneous	22

[Note: Miscellaneous reports comprised the remaining 22 snowmobile CIR's.]

¹⁰ Agency assists are incidents in which NPS employees are contacted by the public safety departments from surrounding jurisdictions outside the park to provide assistance with situations such as search and rescue or incidents involving wildlife associated with the park. "Visitor assists" are events where a park visitor was provided assistance such as fuel, equipment repairs, minor first aid, or directions.

Emergency Medical Services Reports—YNP

Winter EMS reports for YNP were compiled for from 1995-2001 (Wondrak 1998, rev. 1999, 2000, and 2001; Table 33). Information is limited to the number of people who rangers reported assisting, and the types of activities that resulted in the incidents.

Table 17. EMS reports by activity type from December-March 1995-2001-- YNP.

Activity Type	Number of People Assisted	Percentage of total
Ice Skating	3	1%
Sledding (nonmotorized)	3	1%
Skiing	40	16%
Snowboarding	1	1%
Snowcoach riding	18	7%
Snowmobiling	154	62%
Snowshoeing	2	1%
Walking on boardwalks, etc.	29	12%

Source: NPS [Greater than 100% due to rounding]

Motor Vehicle Accidents—YNP

Winter motor vehicle accidents (MVAs) were also compiled for YNP (Wondrak 1998, rev. 1999, 2000, and 2001). The report excludes accidents that occurred on US Highway 191. Accidents that occurred on the Grand Loop Road and on the road between Gardiner and Cooke City, Montana, are included.

Vehicles

Not including the accidents that occurred on US Highway 191, there were 354 motor vehicle accidents from December through March 1995-2001. Of those 354 accidents, 230 (65%) involved snowmobiles, 104 (29%) involved private passenger vehicles, and 20 (6%) involved service vehicles such as busses, delivery vans, garbage trucks, snowplows, and snowcoaches. These numbers may be higher, as some accidents may go unreported. In FY 1998, snowmobilers comprised just 2% of the year's total visitors, but were involved in 9% of that year's MVAs.

Accident Descriptions

The most frequent types of motor vehicle accidents involving wheeled-vehicles in YNP (excluding US Highway 191) were:

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- Vehicle versus vehicle—35%;
- Vehicle versus animal (bison, elk, deer, sheep, or wolf)—28%;
- Single car accidents—18%; and,
- Vehicle versus inanimate object—19%.

The most frequent types of snowmobile accidents were:

- Snowmobile versus landscape feature (tree, river, rock, or ditch)—34%;
- Snowmobile versus snowmobile—32%;
- Lost control of snowmobile, rollovers, and swerves—17%;
- Snowmobile versus snowcoach—5%; and,
- Snowmobile versus bison—3% (most snowmobile versus bison accidents occurred after dark).

Owner

About 70% of all visitors use rented snowmobiles, and 75% of the snowmobiles involved in accidents from 1995-2000 were rental snowmobiles (Borrie 1999; Wondrak 1998, rev. 1999, 2000, and 2001). The US Government owned 7% of the snowmobiles involved in reported accidents, 14% were privately owned, and 2% were owned by YNP's concessioners (for employee use). This indicates that about 8% of people involved in wintertime MVAs in YNP are employees of the park or its concessioners. Similarly, about 7% of people involved in reported snowmobile accidents between 1995-2001 listed YNP as their home.

Contributing Factors

When completing MVA reports, rangers often explain why accidents occurred. When an explanation was provided, the following were cited as contributing factors to snowmobile accidents from 1995-2001:

- Lost control, 24%. (These often resulted from a rider mistaking the throttle for the brake, and consequently accelerating inadvertently while attempting to slow.)
- Poor driving skills, 23%. (For example, improper passing, driving left of center, driving the wrong way down a one-way road.)
- Inattention, 19%.
- Poor road conditions, 12%.
- Inexperience with snowmobiles, 8%.
- Bison in road, 5%.
- Defective machine, 3%.
- Swerving to avoid collision, 3%.
- Other, 2%.
- Alcohol, 1%.

Location

Over the six winters covered in the report, most snowmobile accidents (53%) occurred on the part of the Grand Loop from the West Entrance to the Old Faithful area. The section of the Grand Loop from Old Faithful to the South Entrance accounted for the next largest percentage of snowmobile accidents (21%). About 56% of the motor vehicle accidents involving wheeled-vehicles occurred on the road between Gardiner and Mammoth Hot Springs.

Time

About 90% of motor vehicle accidents involving snowmobiles occurred during daylight hours (8 A.M. to 5 P.M.). The remaining 10% occurred during the night and into the morning from 5 P.M. to 8 A.M. Travel during the night can be particularly dangerous because animals on the roadway are difficult to see. Most snowmobile versus bison accidents, which often result in serious injury, occurred during the night and comprised 41% of all nighttime snowmobile accidents.

Injuries

From 1995 to 2000:

- 72% of MVAs involving snowmobiles resulted in no reported injuries;
- 11% resulted in serious injuries;
- 16% resulted in minor injuries; and,
- 1% resulted in death.

Age

About 4% of snowmobile accidents from 1995 to 2001, when driver age was recorded, were caused by drivers between 10 and 15 years of age. This number is substantially lower than for the years prior to winter 1993-94 before the park began to require that snowmobilers be licensed drivers. Overall, 47% of snowmobile accidents were caused by drivers 35 and younger.

Citations—YNP

By far, the most common winter traffic violation in YNP is speeding on US 191. US 191 is a commercial route with a speed limit of 55 mph and is a major traffic corridor linking the cities of Bozeman, Big Sky, and West Yellowstone to Ashton and Idaho Falls. The highway is intended for and receives a substantially different sort of use than the Grand Loop road or even the Gardiner to Cooke City road. Information about citations issued on US 191 is not included here for this reason. Data was also collected on winter season traffic citations that

were issued to vehicle drivers during the past five winters. The results are discussed below by category.

Vehicles

Excluding those that occurred on US Highway 191, YNP's rangers issued 1581 traffic citations during December through March of 1995 to 2001. Of those:

- 88% were issued to drivers of snowmobiles;
- 11% were issued to drivers of wheeled-vehicles, including pick-up trucks, cars, SUVs, vans and mini-vans; and
- 1% were issued to drivers of bicycles, snowcoaches, or unspecified vehicles.

Snowmobilers comprised 62% of YNP's winter visitation during these years, outnumbering auto passengers by slightly more than 2 to 1.

Incident Descriptions

Of the 1386 citations issued to snowmobilers:

- 36% were issued for speeding;
- 17% were issued for off-road travel;
- 21% were issued for driving without a license or allowing another to do so;
- 11% were issued for failure to maintain control and/or unsafe operation;
- 8% were issued for traffic violations; and,
- 6% were issued for entering closed areas.

All other violations comprised 1% of overall snowmobile citations.

Case Incident Reports—GTNP and the Parkway

Analysis of case incident reports (CIRs) in GTNP and the Parkway includes those reports related to winter recreationists engaged in wheeled-vehicle operation, riding snowmobiles, participating in skiing and snowboarding, and as passengers in snowcoaches and snowplanes. CIRs involving wheeled-vehicles on US Highways 191/26/89 south of Moran Junction in GTNP were excluded, as that route is a major transportation artery with substantial use unrelated to recreation within the park areas. The summary of CIRs encompasses five winter seasons for the months of December through March 1995-2001 (Table 34).

Table 18. Case incident reports from December-March 1995-2001, Grand Teton National Park.

Skiing Use					
Incident Description	Agency Assist	Entering Closed Area	Injury	Pet in Closed Area	Search and Rescue
Total Frequency	1	1	1	3	8

Snowboard Use		
Incident Description	Agency Assist	Entering Closed Area
Total Frequency	1	1

Snowcoach Use	
Incident Description	Total Frequency
Visitor Assist	1

Snowmobiles	
Incident Description	Total Frequency
Agency Assist	27
Damage to Property	4
Entering Closed Area/ Off-Road	59
Misc. Traffic Violations	13
Parking	3
Search and Rescue	2
Suspected Intrusion	6
Underage Operation	3
Visitor Assist	4

Snowplane Use	
Incident Description	Total Frequency
Property Damage	1
Entering Closed Area	1

Wheeled Vehicle Use	
Incident Description	Total Frequency
Agency Assist	9
Entering Closed Area/Off-Road	14
Fail to Obey Traffic Device	17
Investigation	4
Misc. Traffic Violations	38
No Driver's License	15
Parking	42
Pet in Closed Area	11
Speeding	398
Unsafe Operation	22
Vehicle Equipment	27
Visitor Assist	79
Weapons Violation	9

Source: Grand Teton CIR reports

Emergency Medical Service Reports—GTNP

Emergency medical service (EMS) reports were compiled for five winter seasons from December through March 1995-2001 in GTNP and the Parkway. Frequently, the EMS reports do not list the type of activity victims were engaged in at the time of the incident. The activities and data in the following table reflect incidents involving winter recreationists and are limited to incidents that were reported to rangers and required EMS assistance. The analysis excludes EMS activities related to wheeled-vehicle traffic on US Highways 191/26/89.

Table 19. EMS reports by activity type from December-March 1995-2001.

Activity Type	Number of Persons Assisted	Percentage of Total
Not reported	18	69%
Snowmobile	7	27%
Snowcoach	1	4%

Source: Grand Teton EMS reports

Motor Vehicle Accidents—GTNP and the Parkway

Winter motor vehicle accidents (MVAs) were analyzed for five years from December through March 1995-2001

Vehicles

Not including the accidents that occurred on US Highways 191/26/89 south of Moran Junction in GTNP, there were 78 MVAs from December through March 1995-2001. Of those 78 MVAs, 69 (88%) involved wheeled-vehicles and 9 (12%) involved snowmobiles. The

accident statistics for GTNP and the Parkway show a greater percentage of the MVAs involving wheeled-vehicles than is the case for YNP.

Accident Descriptions

The types of MVAs for wheeled-vehicles in GTNP and the Parkway were:

- Vehicle versus vehicle—40%;
- Single vehicle accidents—39%;
- Vehicle versus animal (bison, elk, or moose)—17%; and,
- Vehicle versus snowmobile—4%.

The types of snowmobile accidents were:

- Lost control of snowmobile—29%;
- Snowmobile versus landscape feature (tree or lake)—29%;
- Snowmobile versus wheeled-vehicle—29%; and,
- Snowmobile versus snowmobile—14%.

Location

Wheeled vehicle accidents occurred most frequently from Colter Bay to Moran Junction (36%) and from Flagg Ranch to Colter Bay (23%). Most snowmobile accidents (89%) occurred between the South Entrance of YNP and Flagg Ranch.

Injuries

Most snowmobile MVAs in GTNP and the Parkway resulted in no injuries (87%). Visitors have expressed concern to park staff about safety on the Continental Divide Snowmobile Trail (CDST) in GTNP because of shared snowmobile and automobile use in US Highways 191/26/89. No fatalities have occurred on the CDST within GTNP or the Parkway.

Vehicle versus snowmobile accidents occurred mainly in the Flagg Ranch area. Causes for these accidents included traveling too fast for conditions, unsafe vehicle operation, and one accident occurred when a vehicle with a trailer attempted to swerve around a snowmobile.

Citations—GTNP and the Parkway

Statistics for citations issued to winter recreationists engaged in wheeled-vehicle touring and snowmobiling in GTNP and the Parkway were compiled for five winter seasons from December through March 1995-2001. There were no citations issued for recreationists involved in snowcoach touring.

Vehicles

Excluding those that occurred on US Highways 191/26/89, there were 299 citations issued in GTNP and the Parkway. Of those 299 citations, 230 (77%) involved wheeled-vehicles and 69 (23%) involved snowmobiles.

Incident Descriptions

Of the 69 citations issued to snowmobilers:

- 81% were issued for off-road travel or entering closed areas;
- 6% were issued for unsafe operation;
- 2% were issued for speeding;
- 2% were issued for allowing a driver to operate a snowmobile without a license;
- 5% were issued for traffic violations; and
- 6% were issued for unspecified offences.

Note: The total exceeds 100% due to rounding.

EMPLOYEE HEALTH AND SAFETY

Whether on duty or conducting personal business on their days off, employees living and working in the interior of the park are exposed to health and safety risks of winter use within YNP. In conducting routine tasks, employees can be regularly and recurrently exposed to the hazards of loud sounds, exhaust emissions, repetitive motions, spinal and musculature impacts from travelling extremely rough roads, avalanches, and sharing the roadway with inexperienced and unsafe snowmobilers. Reports from employees (NPS 2001), commercial guides (Carsley, pers. comm., 2001), OSHA (Occupational Safety and Health Administration 2001), and NIOSH (National Institute for Occupational Safety and Health 2001) have raised concerns about employee exposure to the hazards of working with the current mix of winter transportation in YNP. OSHA measured exposures in several work place environments over a single week in February 2000 (National Institute for Occupational Safety and Health 2001). They found high levels of noise, carbon monoxide, benzene, formaldehyde and severe shaking and vibration to employees riding snowmachines during the performance of their work duties. The NPS requires employees in the interior of YNP, as part of their duties, to be in the travel corridors. It is not an occasional, optional exposure for employees working in the interior of YNP.

Sound Emissions

Ranger complaints have cited that even while wearing hearing protection, the noise created by snowmobiling or being in close proximity to snowmobiles is intense (pers. comm. Dimmick,

Tyroler, and Webster). Employees have reported a constant ringing in the ears that directly correlated with time spent on and around 2-stroke snowmobiles. OSHA found that an employee working the express lane, primarily outside the kiosk booth at the West Entrance, was overexposed to noise during the admission of snowmobiles into the park. OSHA also found that a West District patrol ranger was overexposed to noise at a level of 93 decibels while conducting normal snowmobile patrol operations (Occupational Safety and Health Administration 2001). Patrol rangers always work outside the kiosks, and during busy periods entrance staff must leave the kiosks to effectively keep the traffic flowing.

Air Emissions

Air monitoring near the West Entrance has shown significant levels of carbon monoxide, particulates, nitrates of oxides, hydrocarbons, benzene, formaldehyde and other by-products of the internal combustion engine. Concentrations of these pollutants increase during periods of high visitation and/or poor air movement. When air is stagnant, employees working and traveling in or near the primary travel corridors are exposed to these emissions. Complaints of nausea, dizziness, headaches, sore throats, eye irritation, light-headedness, and lethargy are frequent among employees who work at the West Entrance and others who work within the more heavily used travel corridors. OSHA found that an employee working the express lane, primarily outside the kiosk booth at the West Entrance, was overexposed to benzene and formaldehyde, both known carcinogens, as an 8-hour time-weighted average and overexposed to carbon monoxide as a peak concentration (Occupational Safety and Health Administration 2001).

Repetitive Motion Injuries

High traffic volume and/or warm weather, especially on the Old Faithful to West Entrance route, results in the formation of moguls (road bumps) in the groomed, snow-covered road surface. The NPS grooms nightly; however, warm weather, low snowfall, and/or high numbers of oversnow vehicles quickly return the bumpy snow surface to the road. Patrolling and travelling in the park when the roads are rough, particularly Old Faithful to West Entrance, daily for up to 10 hours per day for the duration of the winter season results in the park rangers, maintenance personnel, and commercial guides experiencing trauma to their bodies while performing their jobs. The jarring of riding a snowmobile or driving a snowcoach in these conditions have led to frequent reports of back, arm, and hand injury, pain and/or numbness. NIOSH recommended that either the most heavily used roads in the park be groomed more frequently or that the number of snowmobiles allowed in the park be reduced

to maintain the smoothest roads possible to minimize shocks and jolts (National Institute for Occupational Safety and Health 2001).

Some workers had hand tremor and decreased hand coordination related to snowmobile use (National Institute for Occupational Safety and Health 2001). Employees have reported the need for and have received medical treatment for tendonitis in the wrist and hand pain and numbness (NPS 2001).

Avalanches

Avalanche control is a high-risk operation. NPS staff conduct avalanche control operations on both the South Entrance and East Entrance roads. OSHA identified eight hazards of the park's avalanche control operation for Sylvan Pass on the East Entrance road (Occupational Safety and Health Administration 2001). The eight hazards identified by OSHA are as follows.

- Falling ice cornices: The reverberation of muzzle blasts can cause the ice cornices that hang on the slopes above the gun crew to break loose.
- Falling rocks as weathered rock above the gun crew regularly fractures and breaks.
- Avalanche and snow slides: Groomers and employees on snowmobiles from Lake must pass three target avalanche areas to get to the gun site before they can begin to take mitigation action. Employees who come from the East Entrance must pass 20 target areas to get to the gun site.
- Cold stress and hypothermia: after snowmobiling 20 miles to Sylvan pass, employees from Lake spend three to five hours at the gun site and then snowmobile back.
- Slipping or falling while handling explosives. Employees carry the cartridges to and from the gun site over ice and snow-covered pathways.
- Inadequate communication from Sylvan Pass and areas east of the pass in the event of an emergency.
- Lack of emergency first aid provisions and an emergency plan.
- Back strain or sprain hazards from moving 108-pound ammunition crates.

Most of these hazards occur on the East Entrance road. Here, park staff is being exposed to very significant avalanche hazards to keep a segment of road open that serves only 3% of YNP's winter visitation. YNP has taken steps to partly mitigate these hazards. A barrier and trench behind the gun platform have been constructed; however, neither was engineered for a worst-case scenario (they were the best efforts made with available resources and knowledge). A military-style bunker or gun placement similar to those used to protect beachheads in World War II would offer the greatest protection for gun, crew, and equipment. The bunker has not been constructed nor funded. A warming building at the gun site and an ambulance on Mattracks, accompanying the avalanche crew during each control operation, provide relief from the cold. Beginning in the 2001-2002 winter season, the park's policy states that

avalanche control will only be performed when conditions warrant and are not extreme. Additionally, a permanent repeater was installed on Top Notch Peak this fall to improve communications. To provide emergency care, first aid equipment will be placed in the ambulance on Mattracks, which, along with First Responder qualified personnel, will be a part of each mission. To address back strain and sprain hazards, an advisory has been restated, requiring all ammunition crates to be handled by two people.

Other Snowmobilers' Behavior

Concerns about personal safety result from frequently witnessing unsafe driving by other snowmobilers. Speeding, riding on the wrong side of the road, improper passing, and traveling 2-3 abreast covering both lanes of traffic cause trepidation to employees as they travel the park roads by snowmobiles. Infractions, such as these, often receive citations and hundreds more receive verbal warnings, yet these types of violations continue to occur daily and with high frequency. A survey conducted in 1997 showed that more than 75% of visitors feel unsafe travel behavior of other visitors is important, and 31% said that it detracted from their experience (Borrie and Freimund 1997). Similar concerns by employees are documented in anecdotal reports.

WILDLIFE – ELK AND BISON

The following sections describe the species that are of concern within the scope of this SEIS, bison and elk. These descriptions summarize information provided in the FEIS, hereby incorporated by reference (see pages 143-149 of that document). A review of recent publications available subsequent to the publication of the FEIS is provided in a separate section following this summary. To clarify terms used in this document that pertain to the effects of oversnow motorized use on wildlife, the following definitions are provided and are based on park regulations and policies.

Conflict: a situation resulting from opposing desires or needs. The human desire to recreate in ungulate winter range versus an animal's need to obtain and conserve energy often results in conflict.

Harassment: the act of exhausting, fatiguing, or persistently annoying wildlife. Oversnow motorized use in ungulate winter range can cause harassment of ungulates on or near motorized routes. The word harassment is commonly used in the literature to describe the effects of human activities on wildlife (Canfield et al. 1999).

Disturbance: to interfere with, or destroy the tranquility or composure of wildlife. All of the effects described as associated with oversnow motorized use may be broadly referred to as disturbances.

Wintering wildlife in the GYA are challenged for survival. High snow depths, cold temperatures, and lack of high quality forage can lead to synergistic and nutritional stress, and, consequently, higher rates of competition and mortality. Human activities in the winter may serve to compound these factors. Information pertinent to the scope of this analysis revolves around the location of winter range and winter energy budgets for animals as they may be affected by oversnow motorized use.

Because many of the groomed roadways in YNP bisect ungulate winter range, interactions between elk, bison, and oversnow motorized vehicles are common. Rangers are frequently dispatched to the scene of wildlife-visitor conflicts to direct traffic and to ensure the safety of both visitors and wildlife. Because many of these incidents are not documented in case incident reports, rangers were asked to provide narrative accounts on their experiences dealing with oversnow motorized use and wildlife in YNP.

Of the nine rangers who provided written accounts, all emphasized the frequent, often daily, occurrence of conflicts among ungulates (primarily bison) and oversnow motorized use, particularly snowmobiles. The most commonly cited problems involved snowmobilers unsafely passing bison. As snowmobilers attempt to pass through herds of bison, the animals often bolt and run, and as a consequence are “herded” down the road until they are pushed off the roadway. The experience is especially difficult for the animals when snow berms are high or they are forced into deep soft snow. Another commonly observed situation occurs when snowmobiles drive into the middle of a group of bison, thus aggravating the group and increasing the danger from running animals that have no where to go. According to one ranger, many of the snowmobilers that are cited for off-road violations claim that they left the road in an attempt to evade or otherwise go around bison. Rangers noted that these and other unsafe and harassing behaviors occur despite the availability of safety information that includes recommendations for interacting with animals on the roadway. They attributed these behaviors largely to inexperienced snowmobilers and snowmobilers who lack the patience to wait for animals to cross or exit the roadway.

In addition, poor lighting conditions and weather exacerbate all of the above conflicts, with bison sometimes resting on the roads at these times. Several nighttime collisions involving bison and snowmobilers resulted in severe injuries and two fatalities, and the bison in

question had to be dispatched by rangers. In conclusion, although harassment is not the intent of most interactions, the juxtaposition of heavily used groomed motorized routes and ungulate winter range renders it virtually inevitable along some road segments.

To obtain site-specific information on particular road segments, YNP rangers and other park employees were surveyed¹¹ as to the type of interactions they've encountered, the frequency of such interactions, and the time of day and month that most interactions occurred. As required by NEPA, these anecdotal observations represent the best available site specific information and are viewed by NPS as a useful means to characterize situations commonly encountered along park roads in the winter. This information is used to supplement existing analyses presented in this document and the FEIS; data obtained from this survey does not alter the original determination of effects. Its purpose is to provide ancillary information on the frequency and location of the identified impacts.

This survey was criticized by the cooperating agencies as being unscientific and biased. NPS asserts that this information was solicited in part to respond to the agencies' contention that adverse effects to wildlife as a result of oversnow motorized use in the parks are based on conjecture and are unsubstantiated. The agencies object to findings in the FEIS that concluded that such effects exist and point to the lack of support for these findings in the scientific literature. While it is true that the literature does not contain conclusive evidence that oversnow motorized use is adversely affecting ungulate populations in the parks, it does acknowledge several important factors: the extreme challenges wildlife species face in severe winter environments; the high importance of winter ranges as refugia; and describes the effects that human activities cause when superimposed on these ranges (see FEIS, pages 237-241). Even though Knight and Cole (1995) acknowledged that the understanding of how recreation affects wildlife is disparate and seldom definitive, they point to preliminary evidence that suggests recreation can harm wildlife. They also referenced a review of pertinent literature revealing that most studies document immediate, short term responses of individuals rather than long term responses by populations when disturbed by recreational activities (Boyle and Sampson 1985). According to Canfield et al. (1999), responses of ungulates to recreation activities on winter ranges vary from apparent disinterest to flight, but every response has a cost in energy consumption. For example, even when disturbances do not result in overt responses (e.g., fleeing), relatively high energy expenditures caused by

¹¹ Approximately 60 total employees were polled. These employees were chosen because they regularly travel the park roads and have worked in the park for multiple winter seasons. In addition, many of these employees also live in the interior of the park in the winter time.

increased heart rates have been confirmed for a variety of ungulate species. Both Aune (1981) and Cole (1978) noted that ungulates were displaced from areas immediately adjacent to snowmobile routes in YNP, and Aune stated that recreational activity increased energy expenditures and reported that the most significant expenditures occurred during interactions along groomed snowmobile routes.¹² Although Aune concluded that population level effects were not evident, he noted that the snowmobile route from West Yellowstone to Old Faithful, because it passes through core winter range, posed a serious problem to wintering ungulates. Therefore he recommended the trail either be rerouted, that use limits be imposed and use redistributed to other less critical areas of the park, or that snowmobile use be restricted to guided tours led by a qualified naturalist. Caslick (1997), also concerned about the juxtaposition of heavily used oversnow motorized routes and critical winter range in YNP, recommended that intensive winter energetics research be conducted to further define the magnitude with which winter recreation negatively affects winter-stressed wildlife in YNP. He considered snowmobiling in thermally influenced wildlife ranges in YNP to be the most pressing visitor use management issue in YNP, and noted that snowmobiling has been reported to impact ungulates outside of the park in Montana and Wyoming. He concludes that “there is no apparent reason to expect that similar effects would not occur in YNP, where winter conditions are generally more severe and the intensity of snowmobile use is generally higher...”.

NPS concurs with the above literature reviews, and maintains, as concluded in the FEIS and ROD, that there are indeed effects to wildlife from oversnow motorized use, and that these effects are adverse. The parks were established, in part, to provide areas of security for wildlife. Population level effects do not need to be indisputably proven in order for the parks to make a determination that adverse effects to animals are occurring as a consequence of oversnow motorized use in critical ungulate winter range.

For many park values, including wildlife, “objective” scientifically driven standards or definitions for what constitutes an adverse effect do not exist and are not quantifiable. The role of scientific research in the field of wildlife behavior is, to paraphrase Whittaker and Knight (1999), to provide management with information on wildlife responses to human activities. The role of management is to develop appropriate standards or ideals that define what is acceptable for a given area or activity. Clearly, park regulations, policies, and

¹² Ungulates were reported to habituate to recreational activity as the winter progressed, possibly due to the progressively weakening condition of the animals coupled with increasing snow depth. NPS maintains that habituation is not a desired condition for wild animals in the parks.

enabling legislation intend for the parks to have high standards and to have the discretion upon which to judge whether or not these standards are met.¹³ Service-wide regulations prohibit snowmobile use that “disturbs wildlife” (36 CFR 2.18). Therefore, NPS does not have the authority to allow snowmobile use where disturbance occurs. The purpose of the analysis of impacts to wildlife is to determine whether or not current snowmobile use violates this regulation (see Chapter IV of this document for the effects analysis by alternative). As stated above, the survey in question was used to characterize the type, location, and frequency of conflicts related to wildlife and oversnow motorized use in YNP, and to hypothesize, by alternative, where risks to wildlife were more likely to occur. This type of assessment assists not only in identifying areas of highest concern, but also in analyzing the potential effectiveness of mitigation measures and alternative features.

Survey Results

Twenty employees responded. On average, they spend approximately 46% of their time on park roads, and have worked an average of 7.5 winters in YNP. Respondents were asked to categorize road segments using the following types of documented conflicts:

1. animals herded down the road;
2. animals prevented from crossing the road;
3. visitors deliberately approached closer than necessary to provoke a response for photos or amusement;
4. collisions that did not result in known mortality (information related to road killed animals was obtained from park files);
5. activities caused animals to flee;
6. activities caused an animal to attack or threaten visitors;
7. activities that elicited responses that did not include fleeing but were obviously disturbing (e.g., animal was too weak to leave roadway but was clearly stressed; describe these interactions); and
8. no conflicts observed .

Based on their responses, road segments were ranked based on how many respondents observed conflicts on a particular segment and the perceived frequency of the conflicts (how many per day, week, or month; Table 20). All but one respondent reported observing conflicts. Of the remaining 19 employees who did report conflicts, 10 reported that both snowmobiles and snowcoaches were involved; the remaining nine employees cited snowmobiles as the sole cause of the conflict. The road segments with the heaviest levels of traffic were also ranked among the highest in terms of conflicts with wildlife. Over all road

¹³ Issues related to assessing the effects of winter use on wildlife are addressed under the adaptive management provision of each alternative. NPS proposes standards in this document based on an interpretation of park policies, EOs, and laws. Using appropriate methodology, impacts will be assessed as to whether or not they meet these standards. Outcomes include the formulation of new management actions or a revision of the standards themselves based on their ability to detect change.

segments, the most observed conflicts occurred primarily between 8:00 a.m. and noon during January and February, and the most frequent conflict reported was the herding of animals down the roadway.

A study was initiated during the winter of 2001-02 in YNP to obtain additional information on the types and frequency of wildlife-visitor interactions associated with the groomed roads from West Yellowstone to Old Faithful. Biologists travel the groomed routes daily and record all wildlife observations on and near park winter roads. Information on wildlife species, location, time of day, group size, and distance from the nearest road is collected. They also record visitor activity, classify wildlife responses, and document wildlife-visitor interactions using digital photography. Results of the first year of this study will be reported in the FEIS.

Ungulate Winter Ranges

Ungulates rely on restricted winter ranges in which food and cover may be limited. Major episodes of winter stress, low forage availability, and declining physiological conditions lead to increases in mortality (Meagher 1998). Competition is particularly severe in winter, when thousands of large ungulates move to lower valley elevations to forage on exposed vegetation in areas of low snow depth (Clark 1999). Concern over the loss of elk winter range in Jackson Hole resulted in the creation of the National Elk Refuge in 1912, to which a great many elk now migrate before the winter recreation season begins. Moose migrate from higher elevations in and surrounding GTNP to the valley floors and canyon mouths where snow depths are lower.

Table 20. Road segments and related wildlife conflicts in YNP. Based on an employee survey of observed interactions.

Road Segments: Ranked by number of reported conflicts from high to low	Overall frequency of conflicts	Time most conflicts occurred	Most frequent conflict reported	Second most frequent conflict reported	Third most frequent conflict reported	Month most conflicts were observed
1. West Entrance to Madison	> than 5 per day	8:00 a.m. - noon	Animals herded down the roadway	Animals prevented from crossing the road	Visitors deliberately approaching animals ¹⁴	February
2. Madison to Old Faithful	Respondents split evenly: 3-5 per day and > 5 per day	8:00 a.m. - noon	Animals prevented from crossing the road	Animals herded down the roadway	Visitors deliberately approaching animals	February
3. Old Faithful to West Thumb	> 5 per day	12:00-5:00 p.m.	Visitors deliberately approaching animals to provoke a response (Tie)	Activities cause animals to flee (Tie)	Animals prevented from crossing the road	December
4. Fishing Bridge to East Entrance	3-5 per day	Primarily < 8:00 am and from 5:00 p.m. to 7:00 p.m.	Animals herded down the roadway	Activities cause animals to flee	Animals prevented from crossing the road	January
5. Canyon Village to Fishing Bridge	Respondents split evenly: 3-5 per week and 1-2 per month	12:00-5:00 p.m.	Animals herded down the roadway	Visitors deliberately approaching animals to provoke a response	Animals prevented from crossing the road	January
6. Madison to Norris	1-2 per month	8:00 a.m. - noon	Animals herded down the roadway	Animals prevented from crossing the road	Visitors deliberately approaching animals	January and February - tied

¹⁴ Refers to instances where visitors approach closer than necessary for photos or amusement purposes.

Road Segments: Ranked by number of reported conflicts from high to low	Overall frequency of conflicts	Time most conflicts occurred	Most frequent conflict reported	Second most frequent conflict reported	Third most frequent conflict reported	Month most conflicts were observed
7. Mammoth to Norris	1-2 per month	8:00 a.m. - noon	Animals herded down the roadway	Activities cause animals to flee	Animals prevented from crossing the road	January
8. West Thumb to Flagg	1-2 per month	8:00 a.m. - noon	Activities cause animals to flee	Animals prevented from crossing the road (Tie)	Visitors deliberately approaching animals (Tie)	February
9. Fishing Bridge to West Thumb	1-2 per month	12:00- 5:00 p.m.	Animals herded down the roadway (Tie)	Animals prevented from crossing the road (Tie)	Visitors deliberately approaching animals	December , January, and February - all tied
10. Norris to Canyon¹⁵	3-5 per month	8:00 a.m. - noon	Animals herded down the roadway	Animals prevented from crossing the road	Visitors deliberately approaching animals	January and February - equal

In YNP, thermal areas are important components of winter range because warm ground keeps these areas relatively free of snow, enabling bison and other ungulates to feed in the otherwise snowbound interior of the park (Meagher 1970, 1971, 1976, 1978, 1985, 1998; Murie 1940; Miller 1968; Craighead et al. 1973; Ables and Ables 1987; NPS 1990). During severe winters, valleys supporting bison have either extensive thermal or warm areas, or many small thermal areas among which bison movement is possible. Streams that remain unfrozen because of an influx of warm water are an additional feature of most wintering areas of bison in YNP. Meagher (1978) wrote “Scattered thermal sites—particularly warm ground with less snow—apparently provide a margin for survival for bison in the harshest wintering areas of YNP.” During four aerial counts of bison in Hayden and Pelican Valleys in winter 1997-1998 (December through March), bison were usually located in or near thermal areas and along the banks of thermally influenced streams (Kurz 1998). As reported

¹⁵ Low rank because only two respondents reported conflicts along this route.

in a number of studies since 1973, thermal areas with snow-free vegetation or shallow snow are also very important winter habitats for elk along the Madison, Firehole, and Gibbon Rivers (NPS 1990).

Ungulate Energy Budgets

Ungulates function at an energy deficit during winter because snow reduces forage availability, affects an animal's ability to escape predators, and increases energy costs at a period of time when the nutritional value of winter forage is low (Beall 1974; Skovlin 1982; Mattfield 1974; Parker et al. 1984). Energy costs, expressed in calories expended per unit of time for various activities, must be balanced by energy intake from foods that provide necessary proteins, fats, and carbohydrates. Malnutrition may cause mortality directly, or increase the risk of death by disease or predation.

Deep snow greatly increases the amounts of energy expended by elk for locomotion in YNP and elsewhere (Parker et al. 1984, Telfer 1978). DelGuidice et al. (1991) found severe energy deprivation of elk in YNP to be associated with increased elk density or deep snow cover. Elk feeding in thermal areas and snow-free areas near warm springs fed an average of about 11 hours per day; in comparison Coughenour (1994) estimated that elk in snow (up to 60 cm deep) may require 16 hours of feeding per day to meet their energy requirements.

Aune (1981) described bison movements as appearing to be less restricted by snow than were elk movements. Bison primarily used a network of well-established trails and travel routes, including riparian areas. Bison do use groomed and plowed roads, but use is considered minor compared to off-road travel (Bjornlie 2000, Kurz et al. 2000; see FEIS Chapter 4, alternative A). All of these strategies help to reduce energy expenditures to some degree, and consequently, enhance their over-winter survival. Severe winter conditions are a main cause of bison mortality. Bison die during major episodes of winter stress, low forage availability, and declining physiological conditions (NPS 1998).

Federally Protected Species

The Endangered Species Act requires an examination of impacts on all federally threatened or endangered species. The affected environment description for these species occurs in the FEIS on pages 150-55, and greater detail may be found in the Biological Assessment associated with that document. These materials are incorporated by reference. Federally protected species were dismissed from the SEIS at the beginning of Chapter III.

Recent Publications

Winter Bison Monitoring – 2001 Annual Report

This report¹⁶ by YNP staff describes a multi-year monitoring effort on bison use of winter roads. It relates use of roads by bison to measured weather variables such as average snow depth and temperature, and correlates the number of bison observed on roads to their activity (feeding, resting, traveling), habitat, location, time of year, and survey method. In the conclusion, it is noted that bison use of groomed roads comprises a relatively small portion of their time in winter. Nonetheless, it is acknowledged that longer term studies of bison movements, distribution and population dynamics indicate that bison use of groomed roads may have shifted the cumulative energetics of bison behavior, movement patterns and survival of winter groups within YNP. Despite the relative ease with which bison may travel on groomed roads, the added stress upon bison from close proximity to snowmobiles, snowcoaches and winter park visitors may offset any energy gains that contribute to winter survival. This discussion is entirely consistent with the disclosure of effects on bison in the FEIS. Because the current effort to monitor bison does not attempt to collect data about bison behavior in relation to human use of roads, this report did not contribute additional information useful in this analysis.

Snowmobile Activity and Glucocorticoid Stress Responses in Wolves and Elk

This report¹⁷ documents the use of fecal glucocorticoid (FGC) levels to measure physiological stress in wolves and elk. FGC levels were tested in several national parks, including Yellowstone, where snowmobiling is a popular activity. The report indicates that higher FGC levels were found in wolves in areas and times of heavy snowmobile use, and for elk, day-to-day variations in FGC levels paralleled variations in the number of snowmobiles; i.e., higher numbers of snowmobiles produce higher amounts of FGC indicating higher stress levels. The study reported higher FGC response to snowmobiles than to wheeled vehicles. Nonetheless, the authors note that despite measured stress responses, there is no evidence that current levels of snowmobile activity are affecting population dynamics for either wolves or elk. As with the bison monitoring report, this assessment is entirely consistent with the disclosure of impacts in the FEIS. Although the FEIS documents no impacts at the population level for wolves or elk, it does disclose

¹⁶ Reinertson, Reinhart, and Kurz. May 11, 2001

¹⁷ Creel, S., J.E. Fox, A. Hardy, J. Sands, B. Garrott, and R.O. Peterson. In Press. Conservation Biology.

disturbance to *individual* animals from winter recreation, including displacement and behavioral responses.¹⁸

In conclusion, the authors note an interpretive dilemma. They acknowledge that at one extreme, one could argue that in the absence of an effect on population size, human activities may be considered benign or acceptable. At the other extreme, one could argue that human activities inducing physiological stress responses should be curtailed, considering the large body of research which shows that prolonged and elevated FGC levels reduce survival and reproduction.

Bison and Elk Responses to Winter Recreation in Yellowstone National Park

This thesis by Amanda Hardy of Montana State University presents the results of research that examined the effects of winter recreation on elk and bison abundance, distribution, behavior, and stress hormone levels in the upper Madison River drainage of YNP. Several factors were examined: human activity levels; human-ungulate interactions; elk and bison distribution patterns in relation to the road corridor and areas of human activity; and elk and bison fecal glucocorticoid (FGC) levels as a physiological index of stress. Using these data, models were run to test if daily and cumulative numbers of vehicles entering the study area or types of winter recreation activities and human behaviors contributed significantly to elk and bison distribution, behavior, and stress hormone responses. In addition, elk and bison behaviors and numbers were compared to a study conducted 20 years ago when winter visitation was considerably less than it is currently (Aune 1981).

To summarize, while close proximity of any human activity invoked negative responses, bison and elk appeared to habituate as exposure to traffic increased throughout the winter recreation season. When comparing responses between wheeled vehicle activity and oversnow vehicle activity, no difference was found in bison and elk behavior or distribution. Levels of FGCs were, however, higher in bison and elk during periods of wheeled vehicle travel, with FGC levels in elk increasing as traffic entering the West Yellowstone gate exceeded 7,500 cumulative vehicles subsequent to the spring opening of the roads in late April. Elk along the more heavily used West Yellowstone to Old Faithful route were also more behaviorally sensitive compared to elk observed between Madison and Norris, with elk increasing their distance from all roads as increasing numbers of vehicles entered the West

¹⁸ The State of Wyoming submits that for a population that is already "over target" in the GYA [presumably elk - ed], one could argue that this is a positive management action. NPS does not agree with this position. Populations of elk, bison and other wildlife within the park are regarded under law as park resources and values to be protected. Herd numbers or targets of hunted populations do not apply in the park.

Yellowstone gate. Overall, off-trail travel (skiers, snowshoers) induced the most behavioral responses in both species.¹⁹

The author concluded that winter recreation in YNP is co-existing with bison and elk without causing declines in population levels, and that continued use of traditional winter range remains essentially unchanged despite a substantial increase in winter visitation. However, the fact that elk FGC levels increased with increasing amounts of traffic indicates that nonobservable responses do occur and may contribute to chronic stress. Chronic stress may affect resistance to disease and survival, and may inhibit reproductive potential. Despite the potential for deleterious effects, elk and bison populations in the Madison River drainage appear stable to increasing at this time.

While the disclosure of impacts to ungulates in the FEIS does not specifically include a discussion of FGC levels as an indicator of stress, the overall conclusions are similar: oversnow motorized access to the parks does not appear to be resulting in long term effects to populations of elk and bison. Nonetheless, harassment and displacement of *individuals* is evident, and remains a stated concern.

NATURAL SOUNDSCAPES

Discussion of the natural soundscape may be found on FEIS pages 158-171. The FEIS introduces analysis by explaining sound levels, sound level changes and audibility. It explains natural and human-generated winter sound sources, and current sound levels relating to oversnow vehicles. A great deal of information is provided on measurement of ambient sound levels and human-generated sound at eight monitoring sites in the three parks units. This information, incorporated by reference into this SEIS, is briefly summarized here. A report was prepared to document the analysis of sound and impacts on the natural soundscape in the FEIS: *Technical Report on Noise: Winter Use Plan Final Environmental Impact Statement* (Harris, Miller, Miller and Hanson, Inc., June 2001).

An important part of the mission of the NPS is to preserve or restore the natural soundscapes associated with units of the national park system. The natural soundscapes (also referred to as natural quiet and the natural ambient sound level) are the unimpaired sounds of nature, and are among the intrinsic elements of the environment that are associated both with the purpose of a park and with its natural ecological functioning. They are inherent components

¹⁹ The effects of nonmotorized use on wildlife are disclosed in the FEIS and are incorporated by reference.

of "the scenery and the natural and historic objects and the wildlife" protected by the NPS Organic Act. Natural sounds and tranquility are major resources of many national parks and are valued by visitors. Increasingly, even parks that appear as they did in historical context do not sound like they once did. Natural sounds are being masked or obscured by a wide variety of human activities. NPS policy is to facilitate, to the fullest extent practicable, the protection, maintenance, or restoration of the natural soundscape resource in a condition unimpaired by inappropriate noise sources. Every visitor who so desires should have the opportunity to enjoy natural soundscapes and to hear the sounds of nature without impairment.

The existing winter sound environment in each park is a combination, in varying degrees, of natural and human-generated sounds. During winter months some significant natural sound sources present in other seasons are not present in either GTNP or YNP. These sounds include the rustling of leaves of deciduous trees, birds, insects and animals, and, to a lesser extent, waterfall and stream sounds. In the winter months, water flow in streams and rivers is lower than during the spring and summer, and ice covering the streams reduces emitted sound levels. Generally, winter background natural sounds are limited to wind, wind-rustled coniferous trees, muffled streams, waterfalls, and animals. In YNP, the unique natural sound of thermal activity associated with hotpots and geysers are notable. Because of the differences in natural sources, background sound levels in wilderness or national park areas have been measured as lower during the winter than during the other seasons (Gdula 1998, Foch 1999).

Human-generated intrusions include snowmobiles and snowcoaches that travel along designated groomed and ungroomed routes in both YNP and GTNP, as well as snowplanes that are used by ice fishers on Jackson Lake in GTNP. Human-generated intrusions also include wheeled vehicles on plowed roads in GTNP and along the Parkway road, such as passenger vehicles that are often pulling snowmobile trailers, and occasional plow and supply trucks. A limited number of diesel buses also travel to Flagg Ranch for snowcoach tours into YNP. Other intrusions are the more localized sounds of cross-country skiing, winter camping, lodging and human voices. Also, aircraft overflights occur over both parks. These consist of high altitude commercial overflights, regular traffic at GTNP associated with Jackson Hole Airport, occasional NPS flights for research or other park purposes, and occasional private or charter flights.

Areas of primary concern for this analysis, relative to natural soundscapes, are those where mechanized noise from wheeled or oversnow vehicles on plowed, groomed or ungroomed motorized trails and routes affects the natural soundscape within the parks. For purposes of this analysis, the existing noise environment is described in terms of the proximity to these trails and routes.

Four studies were drawn upon to describe the existing natural background and human-generated sound levels in YNP and GTNP. Three were done in 1994-1996 by Bowlby & Associates, Inc., as part of a study of the Continental Divide Snowmobile Trail (CDST); they examined the sound levels of wheeled vehicles, snowmobiles, and snowplanes in GTNP, along the Parkway road heading up to Flagg Ranch, and in the southernmost part of YNP. Some short term samples of background sound level data were also collected (Bowlby & Associates 1994; 1995; and 1996). The fourth study, by Harris Miller Miller & Hanson Inc., and Bowlby & Associates, Inc., was conducted in February and March 2000 specifically with two purposes: (1) measuring background sound levels in YNP and GTNP, and (2) assessing the noise impact of man-made sounds, including snowmobiles, snowcoaches, snowplanes, automobiles, buses and aircraft for the alternatives in the EIS (Harris Miller Miller & Hanson 2000), Bowlby & Associates 2000). Results of studies are reported in detail in the FEIS.

VISITOR ACCESS AND CIRCULATION

Discussion of winter visitor access and circulation may be found in the FEIS on pages 175-184. The FEIS describes regional access to each park unit, which amounts to listing interstate highways and gateway communities. The FEIS enumerates roadways and motorized trails within each park unit, and describes available services and attractions associated with each road segment. Park facilities and winter destination areas are also described, with particulars given in the areas of lodging and parking. This information, incorporated by reference into this SEIS, is briefly summarized here.

Five gateway communities and park entrance stations serve as local access to YNP. U.S. Highway 89 through Gardiner, Montana serves the North Entrance Station, 54 miles south of Livingston, Montana. The Northeast Entrance Station provides direct park access from Silver Gate, Cooke City, Red Lodge, and Billings, Montana via U.S. Highway 212. The East Entrance Station connects the park to Cody, Wyoming by U.S. Highway 16, 53 miles east of the park. The Parkway (U.S. Highway 89/287) provides access from the south. U.S. Highways 20 and 287 serve access to the West Entrance Station, through West Yellowstone.

Regional access to the Parkway is provided via U.S. Highway 287 from the Moran Entrance to GTNP on the east, and U.S. Highway 89 on the south from Jackson, Wyoming through GTNP. GTNP administers the Parkway. Interstate 15 on the western edge of the region provides access to the park from Idaho Falls, Pocatello, and Boise, Idaho. Interstate 80 serves as a major east-west connection for visitors entering the park from the south. The primary gateway community for GTNP is Jackson, Wyoming, located about 3 miles south of the park boundary on U.S. Highway 89. Dubois, Wyoming, about 50 miles east of Moran along U.S. Highway 26/28, is a full service community through which all travel from the east must proceed, and through which people can access YNP, GTNP and the Parkway as an alternative to traveling through Jackson. The northern access route, U.S. Highway 89/287, is closed in the winter to wheeled vehicles north of Flagg Ranch through YNP.

YNP roads are maintained for many purposes including touring and sightseeing, accessing trailheads, and park management. During the winter, all park roads are closed to wheeled vehicular traffic with the exception of Highway 191, which provides access between West Yellowstone and I-90 near Bozeman, Montana, and the road from Mammoth to Tower and Tower to the Northeast Entrance Station (Cooke City). These two roads provide the only regional access through the park during the winter.

Visitors reach most park features via snowmobiles, snowcoaches, and cross-country skis. Staging areas, or points of access, for oversnow routes into the park are important components of the winter visitor experience. They typically include a parking area with appropriate signing and may have restrooms, a warming hut, and snowmobile rental facilities. Snowcoach routes offered by concessionaires provide access to the park from some staging areas. The staging areas for trips into YNP are near Mammoth Hot Springs in the north, at Pahaska Teepee in the Shoshone National Forest near the East Entrance, at a parking area just north of Flagg Ranch near the South Entrance, and in the city of West Yellowstone near the West Entrance. These staging areas become congested during peak days because of small or undefined parking and unloading areas. Many difficulties exist in serving winter visitors, including a shortage of all-weather facilities and the dangers of exposure to subzero temperatures.

YNP, GTNP and Parkway transportation segments are tabulated below. Each segment, and features associated with it, is described in the FEIS.

Table 21. Winter travel segments in the three park units.

Segment/ Area	Description	Length (miles)
Canyon Village to Norris Junction	Groomed snow road	13.1
Mammoth Hot Springs to Norris Junction	Groomed snow road	22.6
Mammoth Hot Springs to North Entrance	Plowed route	4.8
Mammoth Hot Springs to Tower Junction	Plowed route	18.5
Tower Junction to Northeast Entrance Station	Plowed route	32.7
Tower Junction to Canyon Village	Closed to motorized use	18.2
Canyon Village to Fishing Bridge	Groomed snow road	15.7
Fishing Bridge to East Entrance:	Groomed snow road	25.4
Fishing Bridge to West Thumb	Groomed snow road	20.0
West Thumb to South Entrance	Groomed snow road	22.0
West Thumb to Old Faithful	Groomed snow road	17.8
Old Faithful to Madison Junction:	Groomed snow road	16.6
Madison Junction to West Entrance	Groomed snow road	13.7
Madison Junction to Norris Geyser Basin:	Groomed snow road	13.7
YNP South Entrance to Flagg Ranch	Groomed snow road	2.0
Flagg Ranch to Parkway west boundary (Grassy Lake Rd)	Groomed snow road	7.6
Flagg Ranch to Colter Bay	Plowed highway, adjacent groomed route	15.6
Colter Bay to Moran Junction	Plowed highway, adjacent groomed route	10.2
Moran Junction to east GTNP entrance	Plowed highway, adjacent groomed route	2.0
Moran Junction to south GTNP entrance	Plowed highway	26.0
Teton Park Road	Nonmotorized route	15.0
Gros Ventre Road	Plowed road	13.0
Moose-Wilson Road:	Plowed road from both ends, 1.5 mi. non motorized	7.0
Jackson Lake	area closed to snowplanes	N/A

The Parkway encompasses 24,000 acres between YNP and GTNP, and is also a roadway through GTNP. It provides access to Flagg Ranch, which serves as a principal winter use staging area. The roadway itself is about 7.5 miles through the Parkway, between the South

Entrance to YNP and the northern edge of GTNP. The road is groomed between Flagg Ranch and YNP and is plowed south of Flagg Ranch to GTNP. The CDST parallels the road between the eastern boundary of GTNP and Flagg Ranch, and is accessed from trail systems on the adjacent Shoshone and Bridger-Teton National Forests out of Jackson and Dubois. Grassy Lake Road, beginning at Flagg Ranch and continuing west outside the Parkway boundary into Targhee National Forest is groomed in the winter for oversnow travel.

Winter lodging facilities in YNP provide a total of 256 rooms with 413 beds in two lodging facilities: Mammoth Hot Springs Hotel and cabins, and Old Faithful Snow Lodge and cabins. In addition to these facilities, Yellowstone Expedition operates a system of yurts near Canyon Village. The park also issues winter backcountry camping permits.

Warming huts in YNP are located at Mammoth, Canyon Village, Indian Creek, Fishing Bridge, Madison, Old Faithful, and West Thumb. A new warming hut has been approved and is planned for Norris, while the Canyon Village, Old Faithful and Madison warming huts are scheduled for replacement. Warming huts at Mammoth, Madison, and Canyon Village locations are staffed by concession personnel who operate small snack bars and maintain vending machines. NPS interpreters, who answer questions and provide information and various forms of assistance to visitors, also staff some of the huts. Snowcoach tours operate from Mammoth Hot Springs, Old Faithful, West Yellowstone and Flagg Ranch (the Parkway). Snowcoaches provide cross-country skiing tours, snowshoe tours, and sightseeing tours.

For GTNP and the Parkway, Flagg Ranch and Triangle X are permitted by NPS to provide overnight accommodations during the winter. Signal Mountain, Colter Bay and Jackson Lake lodge facilities are closed for winter use. Flagg Ranch is the major staging area for oversnow travel from the south to YNP. Dornan's, a park inholder at Moose Junction, is open year-round and offers dining, general store, gas, and visitor information in the winter months. Park Headquarters and the Moose Visitor Center, located across the Snake River just west of Moose Junction, are open in the winter.

WINTER VISITOR USE

Discussion of winter visitor use may be found in the FEIS on pages 184-190 and is hereby incorporated by reference. Updated statistics for the winter season of 2000-01 are included in this document. Winter activity at YNP is composed primarily of visitors on snowmobiles (62%), automobiles and bus passengers (29%), snowcoach passengers (9%), and cross-

country skiers (1%). The FEIS displays tables containing visitor counts by activity from 1992 through 2000 winter seasons; the following tables add to the sum of these seasons the additional amount of use generated during the 2000-01 season.

Table 22. Winter use activities in YNP.

Winter Season	Visitors by Auto	Recreation Vehicle	Bus Passengers	Skiers	Snowmobile Passengers	Snowcoach Passengers	Total Visitors
2000-2001	38,538	139	3,071	390	84,971	11,683	138,792
Total , 1992-2001	329,287	1,351	6,566	5,352	722,835	103,162	1,168,553
Percent	28%	<1%	<1%	<1%	62%	9%	100%
Average	36,587	150	730	555	80,315	11,462	129,839

The greatest amount of winter visitor traffic is at the West Entrance Station, comprising 48% of the total use since the winter of 1989-90. North Entrance use is next highest at 31%, followed by the South Entrance Station with 19% and East Entrance at 3% of the winter visitor traffic. The FEIS displays a table containing visitor counts by entrance station from 1992 through 2000; Table 23 contains information from the 2000-01 season.

Table 23. Winter use visitors in YNP — by entrance station.

Winter	North	West	South	East	Total
2000-2001	43,226	66,468	24,718	4,380	138,792
Total 1992-2001	454,358	712,894	275,615	46,282	1,489,149
% of total	31%	48%	19%	3%	100%*

The North Entrance is the only YNP entrance that is accessible to wheeled vehicles during the winter season. The FEIS displays a table containing visitor activities for the North Entrance station from 1992 through 2000; Table 24 contains information from the 2000-01 season.

Table 24. Winter use activities in YNP — North Entrance.

Winter	Visitors by Auto	Recreation Vehicle	Bus Passengers	Skiers	Snowmobile Passengers	Snowcoach Passengers	Total Visitors
2000-2001	38,538	139	543	7	1,758	2,241	43,226
Total 1992-2001	329,287	1,351	4,038	111	13,362	20,179	368,328
% of total	89%	<1%	<1%	<1%	4%	5%	100%
Average	36,587	150	449	12	1,485	2,242	40,925

Traffic at the North Entrance point is predominately wheeled vehicles with about 89% of the visitors arriving by automobile, bus, or recreational vehicle. The primary attractions accessible from the North Entrance during the winter season are Mammoth Hot Springs, with its associated facilities and nearby cross-country skiing, and the Lamar Valley with its opportunities to view wolves.

The West Entrance Station is the single busiest entrance to YNP, at which 90% of the visitors used snowmobiles as their mode of travel. The FEIS displays a table containing visitor activities for the West Entrance station from 1992 through 2000; Table 25 contains information from the 2000-01 season.

Table 25. Winter use activities in YNP — West Entrance.

Winter	Skiers	Snowmobile Passengers	Snowcoach Passengers	Total Visitors
2000-2001	67	58,292	8,109**	66,468
Total, 1992-2001	206	498,100	57,293	555,599
% of total	<1%	90%	10%	100%
Average	23	55,344	6,365	61,733

**This number includes bus passengers from March. West Entrance closed 2/25/01 due to unsafe conditions. Road reopened to mass transit vehicles on 3/1/01.

Of the 722,835 visitors entering YNP on snowmobiles during the winter seasons between December 1992 and March 2001, 69% (498,100) arrived at the West Entrance. The West Entrance is not accessible to wheeled vehicles.

For the 2001-02 season, 13 outfitters operate snowcoaches in YNP. Combined, they operate 61 snowcoaches with a total of 671 seats. The following is the current mix of snowcoaches: 2 Prinoths, 26 Bombardiers, 16 conversion vans with steel tracks, 13 conversion vans with Mattracks, and 4 sport utility vehicles with Mattracks.

The East Entrance Station is located on Highway 14/16 connecting to Cody Wyoming. The FEIS displays a table containing visitor activities for the East Entrance station from 1992 through 2000; Table 26 contains information from the 2000-01 season. Visitors using this entrance are primarily snowmobile riders (88%) with cross-country skiers being the second highest percentage at 12%. As with the West Entrance, there is no wheeled vehicle access.

Table 26. Winter use activities in YNP — East Entrance.

Winter	Skiers	Snowmobile Passengers	Snowcoach Passengers	Total Visitors
2000-2001	197	4,183	0	4,380
Total, 1992-2001	4,086	30,641	105	34,832
% of total	12%	88%	<1%	100%
Average	454	3,405	12	3,870

Visitors to YNP who gain access through the South Entrance first travel through GTNP and the Parkway. The FEIS displays a table containing visitor activities for the South Entrance station from 1992 through 2000; Table 27 contains information from the 2000-01 season. As with the entrances other than the North Entrance Station, snowmobiles are the primary mode of transportation. The South Entrance Station had the second highest number of snowcoach passengers and snowmobiles during the reported winters. The South Entrance is not accessible to wheeled vehicles.

Table 27. Winter use activities in YNP — South Entrance.

Winter	Skiers	Snowmobile Passengers	Snowcoach Passengers	Total Visitors
2000-2001	119	20,738	3,861	24,718
Total, 1992-2001	940	180,574	27,990	209,504
% of total	<1%	86%	13%	100%
Average	104	20,063	3,110	23,278

Table 28. Winter use activities in Grand Teton National Park and the John D. Rockefeller Jr., Memorial Parkway, winter seasons 1993-01. Data obtained from NPS visitation records.

Winter Season	The Parkway Snowmobile	CDST Snowmobile	GTNP Snowmobile	GTNP Snow-plane	The Parkway Skiing	GTNP Skiing	Total Visitors
93/94	31,268	N/A ²⁰	1,222	1,891	1,548	7,875	6,609
94/95	25,016	1,394	1,113	1,627	1,694	4,723	31,204
95/96	18,004	2,309	2,941	1,384	1,231	6,599	28,735
96/97	19,887	1,930	3,643	1,440	1,294	5,962	30,512
97/98	19,597	1,857	3,951	1,485	1,185	4,151	28,593
98/99	17,160	1,639	3,436	851	1,149	4,242	26,349
99/00	23,400	1,329	4,800	1,091	1,581	5,687	35,654
00/01	31,011	1,307	2,618	1,148	1,987	4,774	42,845
Total	154,075	11,765	22,502	10,917	11,669	44,013	254,941
Percent	60%	5%	9%	4%	5%	17%	100%
Average	19,259	1,471	2,813	1,365	1,459	5,502	31,868

GTNP visitor counts include visitors using the Parkway. Flagg Ranch, a commercial operation licensed to provide various visitor services to complement winter use activities, provides visitor accommodation within the Parkway. The Parkway accommodated 154,075 snowmobile visitors for the eight winter seasons between December 1993 and March 2001, a season average of 19,259 snowmobilers.

Visitor counts for GTNP also include snowmobiles using the CDST. This groomed trail is located immediately adjacent to Highways 26/287 and 89/191/287 and traverses the 27 miles between the East Entrance of the park and Flagg Ranch.

VISITOR EXPERIENCE

Discussion of winter visitor experience may be found on FEIS pages 190-196. The FEIS describes existing visitor experience relative to three topics: winter visitor profile data and survey results; a description of peoples' values and expectations about winter use based on survey data; and measures of visitor experience and satisfaction. Conclusions are drawn and supported in the FEIS about the most important aspects of visitor experience relating to the winter plan alternatives and their consequences. This information, incorporated by reference into this SEIS, is briefly summarized here.

²⁰ CDST did not exist until the winter of 1994-1995.

Winter Visitors and Their Activities

Since the late 1980s, winter use in YNP has fluctuated. Visitation climbed rapidly, peaking at about 143,000 winter users in 1993-1994. Use dropped to a low point of about 113,000 in 1996-97 and rebounded to about 139,000 in 2000-2001. Most winter visitors came to view wildlife, scenery, and thermal features, and rated the presence of clean air, quiet, and solitude as very or extremely important to their visits (Littlejohn 1996). In YNP and GTNP, an average of 75% of winter visitors ride snowmobiles, 12% ride in snowcoaches, 20% use cross-country skis, 2% use snowshoes, and 22% drive automobiles (Littlejohn 1996). Most people who visited YNP from outside Wyoming came from Montana, Utah, Idaho, and Minnesota. For GTNP and the Parkway, most non-Wyoming visitors came from Idaho and California (Littlejohn 1996). Snowmobilers from Wyoming, Montana and Idaho heavily use areas within their own states for snowmobiling. YNP's average winter visitor is a highly educated, relatively wealthy, middle-aged white male. The average age of winter visitors to YNP in 1998 was 45 years old; over half were college graduates; almost 70% lived in a community of 5,000 or more; and their average household income is between \$60,000 and \$80,000. Thirty percent of survey respondents reported annual incomes over \$100,000 (Borrie et al. 1999).

Most visitors report participation in winter recreation outside the parks, in national forests and other recreation areas. Snowmobiling and skiing were the most popular pursuits (Littlejohn 1996). National Forests and other recreation areas in states immediately bordering the parks offer more opportunities for winter recreation, and receive much more use than the three parks. Snowmobiling was the most popular activity for visitors entering the East and West entrances, at about 93% and 89% respectively. Cross-country skiing was the most popular activity for visitors to the North Entrance of YNP and GTNP. Over 70% of North Entrance visitors indicated that wildlife viewing was a primary activity during their visit. Viewing geysers was popular with West Entrance visitors. Between 9 and 10% of visitors listed snowcoach tours as a primary activity.

Values and Expectations of Visitors

People care about YNP as a place of scenic beauty, where wildlife is protected, and where everyone should visit. Survey respondents cared least about YNP as an economic resource. The top three reasons people visited YNP in the winter were to view natural scenery, to have fun, and to view bison. YNP visitors reported gaps between importance of several characteristics of their visit and the degree of satisfaction with the experience for that

characteristic. For example, the importance of “experience the tranquility” was sixth, while the satisfaction with that characteristic was eighteenth. “Experience peace and quiet” was rated 14th in importance, and 25th in satisfaction. “Get away from crowds” had the largest gap: it was 17th in importance, and 40th in satisfaction. This indicates people feel that the values of tranquility, peace and quiet, and solitude are important and anticipated, but that they were often dissatisfied with their actual experience (Borrie et al.1999).

Another survey of winter visitors gauged the primary reasons why they visit these particular parks (Littlejohn 1996a). The following table illustrates the results.

Table 29. Survey-primary reasons for visitation to the parks.

Reasons for Visit	YNP	GTNP
View Scenery	76%	73%
View Wildlife	76%	68%
Take Photographs	63%	66%
Snowmobiling	61%	30%
X-C Skiing	29%	59%
Downhill Skiing	11%	27%
Snowshoeing	1%	17%
Satisfy Curiosity	-	35%

Snowmobilers who reside in Montana and nonresidents vacationing in Montana were asked to give reasons for engaging in their sport (Sylvester and Nesary 1994). Results of this poll are given in Table 30.

Table 30. Top reasons for snowmobiling in Montana.

Reason for snowmobiling	Resident	Nonresident
Observe scenic beauty	81.5%	87.7%
Take in natural surroundings	68.7%	84.2%
Enjoy smells and sounds of nature	57.2%	55.9%
Understand the natural world better	21.1%	30.3%
Learn more about nature	22.6%	33.8%
Get away from other people	41.5%	37.7%
For solitude and privacy	38.4%	45.1.%
So my mind can move at a slower pace	19.9%	24.6%

In 1998 Teton County, Wyoming conducted a survey of county residents concerning their opinions on winter use in the three parks (Teton County 1998). Respondents to this survey were asked, regardless of usage, what they liked and disliked about the parks in winter. In Yellowstone snowmobiling was the number one “like” answer (43%) among respondents, who had at some time visited Yellowstone, while beauty was the number one response for non-users. For GTNP cross-country skiing was the most popular “like” response (27%) among users and beauty was most popular among nonusers (38%). Of the “dislikes” for YNP, responses were evenly distributed among users and nonusers, who gave the following responses: dislike snowmobiling, snowmobiling traffic, snowmobile pollution, snowmobile noise, and crowds. GTNP respondents did not like the cost, snowmobiles, snowmobiles off trail, and crowds. Users (51%) and nonusers (61%) supported limits on snowmobiles. A smaller percentage of respondents supported limiting snowmobiles in GTNP with 47% of users and 40% of nonusers supporting limits. However, regarding overall visitation, most survey respondents felt that current levels of visitation were the right amount (66% of users and 57% of nonusers in YNP). In GTNP 84%, of users and 75% of nonusers felt that current use levels were about right.

During the 1998-1999 winter and summer seasons, the NPS sponsored three surveys relating to the socioeconomic impacts of winter management changes within the three park units. The first survey targeted winter visitors within the GYA (Duffield et al. 2000a). The other two surveys targeted summer visitors to YNP (Duffield et al. 2000b) and the US population as a whole, as well as local and regional residents (Duffield et al. 2000c). The results of these surveys may be found earlier in this chapter in the section *Socioeconomics, Social Values*. Although the results are not reiterated here in their entirety, several findings from the survey are pertinent to the discussion of visitor experience and satisfaction presented below.

Respondents to the three surveys differed somewhat demographically. Winter survey respondents, as mentioned previously, were primarily white (99%), well educated, and relatively wealthy. Sixty-six percent of winter survey respondents were male. Summer visitors were predominately white (98%) and male and female respondents were evenly split at 50%. The national telephone respondents were also predominantly white (91%), but a higher percentage of other ethnic and racial groups were represented. Of this group of respondents 6.5% were African American; 2.8% were Asian; 1.3% were American Indian;

and 6.8% were “Other”. Like the summer survey, respondents to the telephone survey were evenly mixed between males and females.

Although all respondents favored oversnow access to the parks, the summer and telephone respondents were evenly divided between preferring access by snowcoach only and access by snowmobile. A larger portion of the telephone and summer respondents also expressed a preference for limiting use to skiing and snowshoe access only. Overall, respondents to all the surveys indicated concern about the welfare of wildlife. When questioned whether they would favor limiting access to the parks to protect wildlife (for example, bison) regional and national telephone respondents and summer visitor respondents favored closing roads, while local telephone and winter visitors favored visitor access.

The quality of the groomed road surface was the most useful indicator of the satisfaction of visitor's with oversnow travel in Yellowstone (Borrie et al. 1999). More than 80% of winter visitors rate the quality of the road surface as very important. One of the characteristics of snowroads is that moguls (bumps) develop in the road surface as a result of oversnow traffic. Snowroads are groomed in part to help define the travel surface and to provide a smooth surface for vehicles to use. On warmer winter days with heavy snowmobile traffic, the road surface can become so deeply moguled as to render it unsafe for travel. Yellowstone has occasionally closed the West Entrance road due to both safety concerns and because snowmobilers start to leave the road surface and go cross-country to find smoother conditions. These concerns were echoed by NIOSH in their review of employee health and safety issues related to winter travel (*see Employee Health and Safety Section*).

Park staff and other long-time users have recognized there is a relationship between the smoothness of the travel surface and a variety of factors. Those factors include, but are not limited to, temperature (both daytime and overnight), grooming, number of oversnow vehicles, type of oversnow vehicles, and snowfall history. Snow is a very dynamic material and is constantly changing. Despite all the variables, however, temperature seems to play a very important role. In very cold conditions, more vehicles can be accommodated without undue moguling, whereas in warmer, near freezing conditions, relatively few vehicles create significant bumps.

To help better understand these relationships and see if they could be quantified, the National Park Service contracted with the Keweenaw Research Center at Michigan Technological University to conduct a mogul study (Alger et al. 2000). They concluded that bumps reappear in the same locations day after day, and that the bumps reached an

equilibrium after a fixed number of snowmobiles. Although the authors had observed a temperature bump formation relationship in other work, they did not observe it in the YNP study. They also concluded, in general, warm snow does not bond well and in turn forms bumps rapidly.

Recent Publications

Results from 2000-2001 Wyoming Snowmobile Survey

This survey was prepared by the Department of Agriculture and Applied Economics at the University of Wyoming. It was sponsored by the Wyoming Department of State Parks and Historic Sites, the University of Wyoming, and the Wyoming State Snowmobile Association.²¹

The survey included both resident and non-resident respondents. A sample of 1,019 nonresidents and 1,073 residents with registered snowmobiles were chosen randomly from the total Wyoming State Trail Program database.

The reports describe methods and results in greater volume than can effectively be summarized. An Executive Summary is provided in Appendix D. Information from the report is also included in the Socioeconomics section of this document. For each report, some notable results that relate to visitor experience in the parks are shown below.

YNP was ranked as the fifth most preferred trail area among resident Wyoming snowmobilers (24.7%). However, Yellowstone was not indicated as a primary destination for this group, accounting for only 2.7% of total trips taken last season. Resident snowmobilers indicated that they would reduce their number of snowmobile trips in Wyoming by 9% if YNP were closed to snowmobile access. The majority of residents (91%) also responded that they would not consider going to YNP if the only winter access was by snowcoach.

Yellowstone was not ranked as a primary destination area among nonresidents and accounted for 3.5% of total trips taken last season. Nonresidents indicated that they would reduce their snowmobiling days in Wyoming by 13% if they were no longer able to snowmobile in the parks. Nonresident snowmobilers (93%) also said that they would not consider going to Yellowstone if the only access were by snowcoach.

²¹ McManus, Coupal and Taylor, August 2001

The preferred solutions for "resolving the snowmobile conflict in national parks" as indicated in the 2000-2001 Wyoming Snowmobile Survey are listed below.

Table 31. Wyoming residents preferred solution for snowmobile conflict in national parks.

Response	Percent
No ban but requirement of cleaner quieter machines	35.0%
No ban and no additional requirements	34.2%
Limited snowmobile access per day or per season	19.6%
Partial Snowmobile ban of highly sensitive areas	11.4%
Lottery or permit system	5.0%
Complete ban of both snowmobiles and snowcoaches	2.0%
Rotation of snowmobiles allowed areas every season	2.0%
Complete snowmobile ban with snowcoaches allowed	1.6%
No opinion	1.4%
Other	15.2%

Table 32. Nonresidents preferred solution for snowmobile conflict in national parks.

Response	Percent
No ban and no additional requirements	37.4%
No ban but requirement of cleaner quieter machines	28.2%
Partial snowmobile ban of highly sensitive areas	17.2%
Limited snowmobile access per day or per season	12.1%
Rotation of snowmobiles allowed in certain areas every season	4.0%
Lottery or permit system	4.0%
Complete ban of both snowmobiles and snowcoaches	2.4%
No opinion	1.8%
Complete snowmobile ban with snowcoaches allowed	1.1%
Other	14.3%

Snow condition ranked as the most important natural feature for choosing a Wyoming snowmobile area among all snowmobilers, with 80.8% of nonresidents and 63.8% of residents rating this aspect in the top three natural features. The two other natural features that most attracted survey respondents were off-trail powder areas and scenic views. Wildlife viewing was ranked as a top natural trail feature by 19.6% of resident respondents and 12.7% of nonresidents.

Table 33. Ranking of top three natural trail features by residents.

Natural Feature	Percent
Snow conditions	63.8%
Off trail powder	59.6%
Scenic views	45.3%
Open areas	33.1%
Solitude	31.9%
Trail availability/quality	22.7%
Rugged terrain	19.7%
Wildlife viewing	19.6%
Other	4.0%

Table 34. Ranking of top three natural trail features by nonresidents.

Natural Feature	Percent
Snow conditions	80.8%
Off trail powder	77.3%
Scenic views	38.7%
Open areas	29.2%
Solitude	22.0%
Trail availability/quality	19.4%
Rugged terrain	16.9%
Wildlife viewing	12.7%
Other	1.1%

Half of resident Wyoming snowmobilers did not see a need for cleaner and quieter snowmobiles but 50% also said they would pay more to use them if these vehicles were available. A minority of nonresidents (28.2 percent) thought there was a need for cleaner and quieter snowmobiles, but 50.5 percent of all respondents said they would pay more to use them if these vehicles were available.

Overall, both nonresident and resident Wyoming snowmobilers were satisfied or very satisfied with snowmobiling in Wyoming (97% and 96% respectively). Both groups also indicated that the availability of parking was a concern. Nonresidents were also concerned with the availability of shelter, trail signing and trail maintenance and grooming.

The survey results from the 2000-2001 Wyoming Snowmobile survey are for the most part consistent with the other survey results concerning the snowmobile experience discussed in Chapter 3 of the FEIS (pages 190-196). Small differences in the importance ranking of solitude and wildlife viewing are noted and may be due to the expected differences between a statewide recreation survey and park specific survey. Based on an evaluation of the survey results discussed in this chapter and in the FEIS, the most important aspects of visitor experience that relate to winter use plans for the national parks are summarized as:

- Opportunities to view wildlife. Winter visitors consistently rate wildlife viewing as a primary reason for visiting the parks. Respondents to the surveys conducted by Duffield et al. (2000a, 2000b and 2000c) were concerned about the possible disturbance of wildlife in the winter. There also appeared to be support from regional and national survey respondents to accept changes in access policy if there was a corresponding benefit to wildlife.
- Opportunities to view scenery. Winter visitors rate viewing scenery as the primary reason for visiting the parks.
- The safe behavior of others. Both snowmobilers and skiers rate this as important and indicate that it has an influence on the enjoyment of their visit.
- Quality of the groomed surface. More than 80% of winter visitors rate the quality of the snow surface as very important.
- Availability of access to winter activities or experiences. Nearly all winter visitors surveyed by Borrie et al. (1999) support oversnow mechanized access as opposed to plowed roads. Winter respondents to the 1998-1999 winter survey (Duffield et al. 2000a) also favored oversnow access for snowmobiles. Over 90% of the respondents to the Wyoming Snowmobile Survey indicated that they would not visit YNP if the only mechanized access were by snowcoach (Wyoming 2001). Respondents to the summer visitor sample (Duffield et al. 2000b) and the phone sample (Duffield et al. 2000c) were more evenly mixed between groomed roads for snowcoaches and groomed access for snowmobiles. Plowed roads also received very low support in the summer and telephone surveys.
- Availability of information. Most respondents are supportive of management actions that provide readily available information about winter opportunities or conditions for safe travel.
- Quiet and solitude. Most survey respondents feel that natural quiet and solitude was important to their park visit. Many were dissatisfied with their desired experience in this regard. About 30% of Wyoming Snowmobile respondents rated this as one of their top three natural trail features.
- Clean air. Clean air is important to most visitors surveyed. This is supported by past national survey results that indicate recreating Americans highly value clean air in their visits to public lands.

ADJACENT LANDS

Discussion of lands and jurisdictions adjacent to the three park units in the Greater Yellowstone Area may be found on FEIS pages 197-198. This information, incorporated by reference into this SEIS, is briefly summarized here.

GYA land ownership or jurisdiction, which excluded the southern portions of both the Bridger Teton and Shoshone National Forests, is a mix of federal, state, and private lands. The 31,000 square miles in the GYA are comprised of the following ownership or jurisdictions:

- National forests (51%)
- Private ownership (24%)
- National parks (13%)

CHAPTER III
AFFECTED ENVIRONMENT

- Other federal agency jurisdictions (BLM, USFWS, and Bureau of Reclamation; (5%)
- Indian reservations (4%)
- State owned lands (3%).

About 95% of the perimeter of GTNP, YNP and the Parkway abuts national forest lands. A high percentage of the national forest system along this common boundary is in congressionally designated wilderness, and inventoried or other roadless areas. Other lands are in wildlife preserves, such as the National Elk Refuge, or other similar designations. Near the gateway communities to both YNP and GTNP, mostly private lands abut the parks.

CHAPTER IV

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter contains the scientific and analytical foundation for comparisons between the alternatives. The alternatives are intended to define the issues sharply and provide a clear basis of choice. Because this is a supplemental EIS the alternatives in this document focus the issues sharply on whether or not there should be snowmobiles allowed in the three park units, and if they are allowed, under what circumstances. Chapter III presents the affected environment, focused on impact areas that may be affected by differences in the SEIS alternatives. Some impact topics addressed in the FEIS require no additional analysis, and these were dismissed near the beginning of Chapter III. Much of the material presented in the FEIS environmental consequences section remains valid – in regard to methods and assumptions as well as for similar alternative features in the FEIS – and are be incorporated by reference as necessary.

IMPACT TOPICS ADDRESSED IN THE SEIS

A number of impact topics remain to be discussed because new information and analyses may have altered the assessment of effects from that presented in the FEIS. *See Impact Topics Addressed* near the beginning of Chapter III. The direct, indirect and cumulative effects in regard to these topics are disclosed.

For each impact topic the methods and assumptions used in its analyses are presented, followed by the direct and indirect effects for each alternative. At the end of the chapter, cumulative effects are addressed for each alternative, as are impacts on adjacent lands. A series of closing topics discuss the following:

- Impairment of Park Resources and Values
- Adverse Effects that Cannot be Avoided
- Irreversible or Irretrievable Commitments of Resources
- The Relationship Between Short Term Uses of the Environment and Maintenance and Enhancement of Long Term Productivity.

DIRECT AND INDIRECT EFFECTS, BY IMPACT TOPIC

THE EFFECTS OF IMPLEMENTING THE ALTERNATIVES ON SOCIOECONOMICS

Summary of Changes in Impacts Between FEIS and SEIS

Nine specific impact estimates were calculated for the SEIS corresponding to estimates for three analysis areas for each of the four alternatives. Table 35 details the changes in total economic output and employment associated with each of the estimates. In all four SEIS alternatives the estimated output and employment impact for the 5-county and 3-state analysis areas are less than one-half of one percent of baseline levels. This is consistent with results found for FEIS alternatives.

Table 35. Estimated economic output and employment impacts for SEIS alternatives compared to selected FEIS alternatives.

SEIS and FEIS alternatives	Analysis area	Change in output (million 1997 dollars)	% Change in output	Change in employment No. of jobs	% Change in employment from existing
SEIS Alternatives 1a ¹ and 1b Snowcoach and ski or snowshoe travel only	5-county 3-state W. Yell.	-15.9 to -21.1 -18.4 to +7.0 ~ 45% of 5-county loss	< 1% < 1%	-378 to -499 -471 to +170	< 1% < 1%
SEIS Alternative 2 Clean/quiet machines – limit 500 per day at West Entrance	5-county 3-state W. Yell.	-2.9 to 15.8 -3.3 to -6.5 ~ 45% of 5-county loss	< 1% < 1%	-68 to -136 -79 to -159	< 1% < 1%
SEIS Alternative 3 Clean/quiet machines – 330 per day at West Entrance – all trips guided	5-county 3-state W. Yell.	-8.6 to -11.1 -9.5 to -12.3 ~ 45% of 5-county loss	< 1% < 1%	-203 to -262 -230 to -299	< 1% < 1%
FEIS Alternative A (Existing Condition)	5-county 3-state W. Yell.	No loss No loss No Change	0% 0%	No loss No loss	0% 0%

¹ Increased winter visitation from current summer visitors to the park under this management option could substantially offset the estimated output and employment reductions from current winter visitors. Impacts of alternative 1b are the same as in alternative 1a, except that they would be offset by a year.

SEIS and FEIS alternatives	Analysis area	Change in output (million 1997 dollars)	% Change in output	Change in employment No. of jobs	% Change in employment from existing
No change in Management					
FEIS Alternative B Clean/quiet machines, no limits– Wheeled mass transit from West Entrance to O.F.	5-county 3-state W. Yell	-13.2 -14.4 winter economy-18.4%	< 1% < 1%	-312 -351	< 1% < 1%
FEIS Alternative D Clean/quiet machines. No limits. No access from YNP East Entrance	5-county 3-state W. Yell	-1.3 No loss No loss	< 1% 0%	-32 No loss	< 1% 0%

Methods for Analyzing Impacts

The general methodologies for analyzing impacts associated with alternative winter management plans within the GYA parks is described in detail in the FEIS (Chapter 4). These previously described methodologies are also employed in the following SEIS analysis. Where appropriate, data and assumptions used in the FEIS analysis are modified based on new information and data that have become available since the publication of the FEIS.

Summary of Regulations and Policies

The National Environmental Policy Act's guiding regulations require analysis of social and economic impacts resulting from proposed major federal actions when an environmental impact statement is prepared. In addition, Executive Order 12898, dated February 11, 1994, on "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" requires federal agencies to assess the impact of actions on minority and low-income communities. The issue of impacts on minority and low-income populations was examined in depth in the FEIS. This analysis showed no substantial variation in low-income or minority impacts across the broad range of alternatives. The minority and low-income topic was therefore dismissed from further consideration in the SEIS. Although

there are no specific regulations requiring protection of social values, impacts on them are considered an important piece of the federal planning processes. The assessment of the economic effects of the proposed action follow the general principles outlined in the U.S. Water Resources Council's *Principles and Standards for Planning Water and Related Land Resources* (U.S. Department of Interior, Water Resources Council 1984).

Assumptions and Methods

Much of the analysis contained in the FEIS was supported by data collected between the last week of January and the first week of March 1999 from winter visitors YNP and GTNP who were surveyed regarding their winter trips to the GYA and their opinions about winter management of the national parks in the GYA. The FEIS (pages 199-202) describes the assumptions and data sources used in estimating the impacts of the FEIS alternatives on the regional economy, income and employment, winter recreation, park visitors, and social values. The questions contained in the 1999 Winter Visitor Survey were designed to gather information and opinions specific to the alternatives examined in the FEIS. This SEIS analysis examines four alternatives, three of them varying in some fashion from the existing decision (FEIS alternative G). Analysis of these new alternatives (alternatives 1b, 2, and 3) is complicated. Alternatives 2 and 3 are particularly complicated by not having survey data on winter visitor opinions and reactions specific to them. The following section details the new assumptions and data sources used in analysis of the socioeconomic impacts associated with the SEIS alternatives. Assumptions and data sources are discussed below only in cases where they differ or augment those used in the FEIS analysis (FEIS 119-202).

New Assumptions Common to All Alternatives

The estimated baseline level of visitors to YNP and GTNP (including the Parkway) presented in the FEIS was 88,250. One assumption used in deriving this estimate has been modified in the SEIS analysis. Rather than applying an equal estimate of the number of entrances into the parks that are actually re-entries by the same person on the same trip to the region, differences are allowed for varying re-entrance rates at different park entrances. For the SEIS analysis it is assumed that the YNP North and West Entrances have a 25% re-entry rate, as used in the FEIS analysis. The East and South Entrances, however, are assumed to have a re-entry rate of 0%.

The impact of these new re-entry assumptions is to change the estimated baseline number of visitors to the parks from 88,250 (used in the FEIS) to 96,842 (used in the following SEIS analysis).

Many of the alternatives provide for a gradual change in the number of permitted snowmobiles to some final level. For purposes of brevity, qualitative and quantitative impacts are presented here only for the final long-run level of use. In that context, alternatives 1a and 1b are the same.

New Assumptions and Data, by Alternative

Alternative 1a, No-Action, and Alternative 1b. No new assumptions were used in this analysis other than the assumption common to all three alternatives of unequal re-entry rates across park entrances.

Alternative 2. From a socioeconomic standpoint, this alternative presents two significant changes or constraints for park visitors: 1) snowmobile entrances per day at the West Entrance (after three years) would be limited to 500 machines (in this alternative, daily snowmobile limitations at the other YNP entrances are above recent historical maximums, and are therefore not constraining), and 2) snowmobiles within the park (again, after three years) must conform to clean/quiet restrictions. The assumptions employed in the SEIS analysis as to how GYA visitors would respond to these restrictions are derived as follows:

As a baseline for snowmobile entrances through the West (and other) park gates, data from the winter of 1997-1998 is used. This data is consistent with that used in the FEIS analysis, and represents a fairly average year for park visitation.

Scenario 1: Analysis of the responses to the 1999 Winter Visitor Survey found that of the survey respondents who were primarily snowmobiling on their trip to the GYA, 59.6% said they would visit the area less frequently if no snowmobile access were allowed to the park. For days when the historical (1997-1998) level of snowmobiles through the West Entrance exceeds 500 machines, it is assumed that 59.6% of the excess over 500 machines would not come to the park due to the restrictions. The remaining 40.4% would choose to still make their trip, but use snowcoaches to access the park, or only recreate on national forest lands outside park boundaries.

Scenario 2: An alternative assumption to that above is that of those snowmobile visitors to the park assumed to be lost in Scenario 1, 50% would schedule their YNP trips for non-peak use periods (when historical entrances at the West Entrance are below 500 machines). Given

the actual historical pattern of use for 1997-1998, this would result in a loss of 29.8% of the excess demand for snowmobile entrances through the West Entrance to YNP.

While cleaner and quieter 4-stroke snowmachines are more expensive than comparable 2-stroke machines, information on 2001-2002 rental rates for these machines in West Yellowstone show their daily cost being in the low to mid-range of all types of machines rented. However, Amfac Parks and Resorts is exclusively renting Arctic Cat 4-stroke snowmobiles this winter and is charging \$182 per day for a two-rider machine (includes tax, damage waiver up to \$500 and helmet). These rates are negotiated with NPS and are based on cost recovery and reasonable profit. Information from YNP (pers. com. John Sacklin, YNP Planning Office) indicates that 4-stroke machines are approximately 30 to 35% more expensive to purchase than comparable 2-stroke machines. This increased cost should (in the long run) lead to marginally lower demand for rental and purchased, 4-stroke machines. Combined with the alternative 2 supply constraints for snowmobile access to the park, however, the impact of the price increases is unknown. What is known is that 88.1% of non-resident respondents to the 1999 winter survey said they would still have made their trip if their total costs had increased by \$100 (Duffield and Neher 2000a). Also, results from the 2000-2001 Wyoming Snowmobile Survey (McManus et al. 2001) indicate 50.2% of Wyoming resident snowmobilers, 50.5% of nonresidents, and 64.4% of snowmobile outfitter clients would be willing to pay a higher price to use cleaner, quieter snowmobiles. Additionally, the 1999 survey asked about willingness to pay for a cleaner and quieter snowmobile. Visitors that rent snowmobiles (42% in the survey) indicated that they would pay \$46.09 per day to rent a "clean and quiet" sled. For the analysis of alternatives 2 and 3, it is assumed that the range of impacts from the Scenario 1 and 2 visitation assumptions, above, includes any marginal impacts on demand of increased machine rental and purchase prices.

Alternative 3. This alternative presents four significant changes or constraints for park visitors: 1) snowmobile entrances per day at the West Entrance (after 2 years) would be limited to 330 machines (daily snowmobile limitations, in this alternative, at the other YNP entrances are above recent historical maximums, and are therefore not constraining); 2) snowmobiles within the park (after 2 years) must conform to clean/quiet restrictions; 3) all snowmobile visitors to YNP must be accompanied by an NPS permitted guide; and 4) no snowmobile access would be allowed to the park after the Presidents' Day weekend: only snowcoach, snowshoe, or ski travel would be allowed after this time. The assumptions

employed in the SEIS analysis as to how GYA visitors would respond to these restrictions are as follows:

As a baseline for snowmobile entrances through the West (and other) park gates, data from the winter of 1997-1998 is used. This data is consistent with that used in the FEIS analysis, and represents a fairly average year for park visitation.

Scenario 1: Analysis of the responses to the 1999 Winter Visitor Survey found that of the survey respondents who were primarily snowmobiling on their trip to the GYA, 59.6% said they would visit the area less frequently if no snowmobile access were allowed to the park. For days when the historical (1997-1998) level of snowmobiles through the West Entrance exceeds 330 machines, it is assumed that 59.6% of the excess over 330 machines would not come to the park due to the restrictions. It is also assumed that 59.6% of the historical snowmobile use in the period after the Presidents' Day weekend will be lost.

Based on responses to the 1999 Winter Visitor Survey, alternative 3 also has the potential to increase use from certain current winter users. The FEIS analysis estimated that the total ban of snowmobiles from YNP would cause those individuals who favor the ban to increase total winter use by approximately 4.5% over the baseline. Alternative 3 combines significant constraints on snowmobile numbers in December through Presidents' Day with a total ban on the machines after Presidents' Day. For the alternative 3 analysis it was assumed that the increased use attributable to the group who favors restrictions on snowmobiles would be one-half of that estimated in the FEIS, or a 2.25% increase to baseline.

Scenario 2: An alternative assumption to that above is that due to significant constraints on the supply of permits for snowmobile use in YNP, historical use over the alternative 3 limits will fill all available capacity in off-peak days. In this scenario during the mid-December through Presidents' Day weekend period, all days would have 330 snowmobiles using the West Entrance.

As in Scenario 1, it is estimated that the snowmobile restrictions will lead to a 2.25% increase in baseline use attributable to those who favor restrictions on snowmobiles within the park.

In addition to the added cost of renting or buying a clean/quiet snowmobile, alternative 3 would also require the use of a guide for trips into YNP. For 2001-2002, the average NPS-approved guide fee was between \$20 and \$25 per person per day. As was discussed for

alternative 3, this increased cost would lead to decreased demand for trips to the park, all other things being equal. Additionally, many current visitors (perhaps particularly resident visitors) may not want to take a guided trip. Data from the 1999 winter survey indicates that approximately 12% of nonresidents and 6% of residents (of ID, MT, and WY) utilized guides. At the West Entrance, this would imply that only about 10% or 50 of the average daily 550 snowmobiles entering the park were guided. It is unknown whether these considerations would lead to actual use even lower than that of Scenario 1. Combined with significant supply constraints for snowmobile access to the park, however, the impact of the price increases is unknown.

Impacts Common to All Alternatives

Actions that affect park visitation levels can impact socioeconomics. If visitor use capacities different than current levels are enforced by reservations, permits, or differential fees, there may be significant impacts on socioeconomics. At this time, future visitor use capacity changes, if any, (other than those implied by the current alternatives) are subject to adaptive management adjustments.

Unless otherwise noted, the duration of all impacts described below is long term.

The Effects of Implementing Alternatives 1a and 1b on Socioeconomics

Alternative 1a represents the current decision. Alternative 1b represents the current decision implemented one year later. For purposes of analysis and discussion, these alternatives are the same and will be referred to as a single course of action below. These alternatives would allow only oversnow mass transit vehicles (snowcoaches) that can meet strict emissions and sound requirements, and ski and snowshoe access to YNP during the winter season. The following analysis of the socioeconomic impacts associated with this winter use management alternative differs slightly from that presented for alternative G in the FEIS. The primary source of this difference is the use of a slightly higher estimated baseline visitation to the parks (as described in Chapter III, *Methods and Assumptions for SEIS Impact Topics*). The modified analysis results for this alternative is presented below.

GYA Regional Economy. The 1999 GYA winter visitor survey asked respondents how their visitation would be affected if both YNP and GTNP were open only to snowcoach, skiing, and snowshoeing. Based on the responses to this survey question, visitation to the GYA by winter visitors who live outside of the 5-county area would be reduced by 33.4% if winter travel were restricted to either snowcoach or nonmotorized travel. This estimated

reduction in visitation is a net change that takes into consideration the responses of those current winter visitors who said they would visit more often if the change occurred. Also considered in the calculation were those respondents who said they would visit the same, but would shift their use to other areas of the GYA (for example from park lands to national forest lands). Table 35 shows that for the largest classes of winter user groups (snowmobilers, skiers, and snowcoach riders) anticipated changes in visitation under alternative 1a changes vary dramatically. While 59.6% of those who snowmobiled on their trip said that they would visit less frequently under this management plan, only 12% of skiers and 14.1% of snowcoach riders said they would visit less frequently. Conversely, while only 5.6% of snowmobilers said they would visit more frequently, 33.7% of skiers and 22.8% of snowcoach riders said they would increase their visitation. The estimate of a 33.4% decrease in visitation to the five county area takes into consideration the anticipated changes in visitation by these diverse groups of winter park users.

Table 35. Visitation response to alternatives 1a and 1b, by visitor type.

<i>If YNP were open only to snowcoach, skiing, and snowshoeing, the visitor would:</i>			
Response	Snowmobile User	Cross-country Skier	Snowcoach Rider
Not change visitation	17.8%	37.2%	42.5%
Visit less frequently	59.6%	12.0%	14.1%
Visit more frequently	5.6%	33.7%	22.8%
Visit the same amount	4.2%	6.5%	7.8%
Not Sure	12.8%	10.7%	12.8%
Sample Size	792	247	106

In the winter visitor survey, park visitors who reside outside of the 5-county area made up 85.9% of total sampled visitors. If 33.4% of these non-five county resident visitors decided not to recreate within the GYA because of the motorized travel restrictions, the local economy would lose these potential visitors' local area expenditures.

Based on the winter survey responses and the IMPLAN input/output model, it is estimated these travel restrictions would reduce the total economic output in the 5-county GYA area by an estimated \$21,100,000. Additionally, it is estimated that 499 jobs within the GYA would be lost due to reduced nonresident expenditures in the area.

While a \$21,100,000 loss in output is a minor impact on the overall 5.7 billion economic output of the five counties, this impact will likely be concentrated in small communities near

the parks. The impacts of alternative 1a travel restrictions on small local economies such as West Yellowstone could be more significant. However, the correlation between West Entrance visits and the West Yellowstone economy is not as close as one might expect (Chapter III *Socioeconomics, FEIS*). Accordingly, it is difficult to predict the actual effect of a change in park visitation on the local West Yellowstone economy.

The town of West Yellowstone levies a local option tax targeted at tourist spending. As noted in Chapter III of the FEIS, tax records show that for the period 1989-1999 tourist expenditures have been growing at a 10% annual rate. Additionally, tourist spending in the winter months accounts for approximately 25% of year-round tourist spending in the town. Given the relative size of the West Yellowstone winter economy (relative to year-round totals) and the recent growth trends for tourist spending, the estimated visitation reductions associated with alternative 1a would likely have a moderate to major short-term negative impact on the town's winter economy, but a minor impact on the year-round economy of the town.

Under the assumption that the economy is closely related to winter park visitation, the impact on the West Yellowstone winter economy would be about a 33% decline, but only an 8% decline in the year-round economy. For perspective, this decline is less than the average one year growth rate, so even under this assumption, the impact is likely to be short term. However, these estimates likely overstate the impacts on West Yellowstone and could be viewed as an upper bound. The impact projections assume that the change in the West Yellowstone winter economy is proportional to change in park visitation. In fact, there is considerable evidence that historical declines in park winter visitation through the West Entrance to YNP have not resulted in proportional declines in the local economy.

For example, in the winter of 1995-1996 West Entrance visitation decreased by 13.4% over the previous year, but resort tax collection increased by 9.6%. The lack of a proportional relationship between park visitation and the local economy is probably due to the extensive winter recreational opportunities proximate to West Yellowstone, but outside of the park—including 400 miles of snowmobile trails. In other words, even without winter access to YNP from the West Entrance, some snowmobilers would continue to visit West Yellowstone to snowmobile on the national forest lands. Also, results from the 2000-2001 Wyoming Snowmobile Survey (McManus et al. 2001) indicate that if YNP and GTNP were closed to snowmobile access, Wyoming resident snowmobilers, and Wyoming snowmobile outfitter clients would increase their annual number of trips to other trails within the region (MT, ID,

CO, SD, and UT) by 52.1% and 20.6%, respectively. The average visitor to West Yellowstone spends only one day of a multi-day trip snowmobiling in the park. Other factors which might impact visitation levels include snow depth, pricing policies, and advertising efforts.

The estimates of reductions in GYA visitation and nonresident expenditures are based on responses to a survey of current winter visitors. The 1999 YNP summer visitor survey asked respondents who had not previously visited the park in the winter whether they would visit the park next winter if a snowcoach, ski and snowshoe only policy were adopted. Responses from this group indicate that new winter users would be attracted to YNP under the policy change and their increased visitation would serve to offset a portion of the estimated visitation losses detailed above. Rather than a 33% reduction in visitation, the reduction could be on the order of 25%. As noted by some local businesses in comments in the DEIS, a change in policy may lead to economic diversification and help some firms that lost business from a variety of users as snowmobiles became the dominant use.

3-State Regional Economy. Overall, 65.5% of winter visitors in the GYA winter visitor survey came from outside the 3-state area of Montana, Idaho, and Wyoming. Responses from these visitors indicate that nonresident winter trips to the GYA would drop by 27.8% under alternatives 1a and 1b.

A loss of the regional expenditures by these nonresidents would lead to an overall reduction of \$18,400,000 in total economic output and 471 jobs in the 3-state area. This is a negligible negative impact in the context of the regional 3-state economy. This estimated reduction would be lessened to the extent that nonresidents would choose to recreate at other locations within the 3-state region instead of in the GYA. The extent of any such substitution behavior is unknown.

Responses from the summer YNP visitor population indicate that increased interest in visiting the park in the winter months under the new management plan could generally offset the expected losses in visitation from the current nonresident winter users, and may in fact lead to a approximate 11% increase in winter visitation.

Town of West Yellowstone. The FEIS provided estimates of output and employment impacts on both the 5-county GYA area and the 3-state region. The SEIS presents impacts on the gateway community of West Yellowstone, MT in addition to the 5-county and 3-state estimates. Overall, the direct spending impacts associated with alternatives 1a and 1b are

estimated to be approximately 45% of the impacts associated with the 5-county area. The total expenditure impacts for West Yellowstone will be a smaller percentage of the 5-county total impacts (that is, smaller than 45%) because West Yellowstone likely has a significantly smaller expenditure multiplier than the 1.60 multiplier derived for the 5-county area.

Based on available information and survey data it appears that, consistent with the conclusions in the FEIS, a majority of the 5-county impacts would be felt by the local West Yellowstone economy. Further, the output and employment impacts on West Yellowstone would represent a much larger percentage of total annual economic activity than did the estimated impacts for the larger, more economically diverse 5-county area.

Social Values. Most winter visitors surveyed support mechanized access to the parks. In the context of overall access to the park, the changes under alternatives 1a and 1b are likely to result in moderate adverse impacts by restricting the most heavily used snowmobiling entrance to the parks.

The current winter visitors to YNP are those who are attracted by the current set of opportunities, which include snowmobiling. These visitors support the past management policy. Among summer visitors (as detailed in Chapter 3, FEIS), there is less support for past management allowing snowmobile use. Among the general public, local residents are evenly divided between past management and the current management plan reflected in these alternatives to allow only snowcoach, ski and snowshoe travel.

Nonmarket Values. These alternatives potentially would impact nonmarket values of winter visitors through a reduction in current winter user visitation resulting from the restriction of mechanized travel to cleaner, quieter snowcoaches.

Based on the winter visitor survey, the nonmarket value of a trip to GYA parks is \$91. It is estimated that park visitation would be reduced by 33.4% resulting from the management change. Based on current winter visitation levels, these estimated reductions in visitation would translate into a \$2,950,000 reduction in the aggregate nonmarket value of winter trips to the parks. This is a minor negative impact. These estimates are based on reduced use by current visitors. It is possible that the loss in total value of visits would be offset in part by a higher quality recreation experience for remaining visitors. This net impact has not been quantified.

Conclusion

In these alternatives, management actions would have a minor to negligible negative impact on the 5-county economy and a negligible negative effect on the 3-state economy through changes in visitation and nonresident visitor expenditures. They also would have a minor negative impact on total current trip nonmarket visitor benefits (through reduced visitation). These alternatives would have a substantially greater negative impact on the economy of West Yellowstone, MT, since an estimated 45% of the total estimated 5-county impacts would be experienced in the town's local winter economy. The changes in these alternatives are likely to result in moderate adverse impacts to some visitors' social values and moderate positive impacts to other visitors.

The Effects of Implementing Alternative 2 on Socioeconomics

Alternative 2 contains a proposal to combine (as primary policy changes) restrictions in snowmobile access through the West Entrance with a requirement for eventual use of clean/quiet snowmobiles within the park. For the analysis of the socioeconomic impacts associated with this alternative, two scenarios are presented. One scenario assumes that, when fully implemented, 59.6% of the excess snowmobile demand (above the 500 snowmobile daily limit) at the West Entrance will be lost. These visitors will choose not to make a snowmobile trip to the park on another day, although about one-third of them will choose to utilize snowcoaches, or other access methods. A second scenario assumes that 50% of the lost excess snowmobile demand from scenario 1 will reschedule trips to utilize days with use levels below the 500 machine maximum. The results of these two scenarios are presented as impact ranges in the analysis below.

GYA Regional Economy. Based on the detailed winter use data for YNP collected during the 1997-1998 winter season, placing a cap of 500 snowmachines allowed per day through the West Entrance to the park would lead to 9.1% decrease in park visitation under the assumption that no use is shifted to off-peak days, and a decrease of 4.6% in visitation assuming that one-half of the excess demand shifts to non-peak use days. In the winter visitor survey, park visitors who reside outside of the 5-county area made up 85.9% of total sampled visitors. If between 4.6% and 9.1% of these non-five county resident visitors decide not to recreate within the GYA because of the West Entrance restrictions, the local economy would lose these potential visitors' local-area expenditures.

Based on this estimated visitation loss and the IMPLAN input/output model, it is estimated these snowmobile entry restrictions would reduce the total economic output in the 5-county

GYA area by between \$2,900,000 and \$5,800,000. Additionally, it is estimated that between 68 and 136 jobs within the five counties would be lost due to reduced nonresident expenditures in the area. While the high estimated loss of \$5,800,000 in output is a minor impact on the overall 5.7 billion economic output of the five counties, this impact will likely be concentrated in small communities near the parks.

3-State Regional Economy. As noted above, it is estimated that placing a cap of 500 snowmachines allowed per day through the West Entrance to the park (among other restrictions) would lead to 9.1% decrease in park visitation under the assumption that no use is shifted to off-peak days, and a decrease of 4.6% in visitation assuming that one-half of the excess demand is shifted to off-peak days.

In the winter visitor survey, park visitors who reside outside of the three-state region made up 65.5% of total sampled visitors. If between 4.6% and 9.1% of these non-three state resident visitors decided not to recreate within the GYA because of the West Entrance restrictions, the local economy would lose these potential visitors' local-area expenditures.

It is estimated that a loss of the regional expenditures by these nonresidents would lead to an overall reduction of between \$3,300,000 and \$6,500,000 in total economic output and between 79 and 159 jobs in the 3-state area. This is a negligible negative impact in the context of the regional 3-state economy. This estimated reduction would be lessened to the extent that nonresidents would choose to recreate at other locations within the 3-state region instead of in the GYA. The extent of any such substitution behavior is unknown.

Town of West Yellowstone. The FEIS provided estimates of output and employment impacts on both the 5-county GYA area and the 3-state region. The SEIS presents impacts on the gateway community of West Yellowstone, MT in addition to the 5-county and 3-state estimates. Overall, the direct spending impacts associated with alternative 2 are estimated to be approximately 45% of the impacts associated with the 5-county area. The total expenditure impacts for West Yellowstone will be a smaller percentage of the 5-county total impacts (that is, smaller than 45%) because West Yellowstone likely has a significantly smaller expenditure multiplier than the 1.60 multiplier derived for the 5-county area.

Based on available information and survey data it appears that, consistent with the conclusions in the FEIS, a majority of the 5-county impacts would be felt by the local West Yellowstone economy. Further, the output and employment impacts on West Yellowstone

would represent a much larger percentage of total annual economic activity than did the estimated impacts for the larger, more economically diverse 5-county area.

Social Values. Most winter visitors surveyed support mechanized access to the parks. In the context of overall access to the park, the changes proposed in alternative 2 are likely to result in minor to moderate local adverse impacts by restricting access to the 500 users per day at the West Entrance.

Nonmarket Values. Alternative 2 potentially would impact nonmarket values of winter visitors through a reduction in current winter user visitation resulting from the restriction of mechanized travel to cleaner, quieter snowcoaches and 500 snowmobiles per day at the West Entrance.

Based on the winter visitor survey, the nonmarket value of a trip to GYA parks is \$91. It is estimated that park visitation would be reduced by between 4.6% and 9.1% resulting from the management change. Based on current winter visitation levels, these estimated reductions in visitation would translate into a \$400,000 to \$800,000 reduction in the aggregate nonmarket value of winter trips to the parks. This is a minor negative impact. These estimates are based on reduced use by current visitors.

Conclusion

Alternative 2 management actions would have a negligible negative impact on the 5-county economy and a negligible negative effect on the 3-state economy through changes in visitation and nonresident visitor expenditures. Given the historical lack of correlation between year-to-year changes in winter visitation to YNP and the West Yellowstone economy, the reduced visitor expenditures under this alternative could have a minor to negligible short term adverse impact on the winter economy of West Yellowstone, Montana. The impact on the year-round West Yellowstone economy is a negligible short term negative impact. Alternative 2 also would have a minor negative impact on total current trip nonmarket visitor benefits (through reduced visitation). The changes proposed in alternative 2 would be likely to result in minor adverse impacts to some visitors' social values.

The Effects of Implementing Alternative 3 on Socioeconomics

Alternative 3 contains a proposal to combine (as primary policy changes) restrictions in snowmobile access through the West Entrance with a requirement for eventual use of clean/quiet snowmobiles within the park and a requirement that all snowmobile visitors to the park must travel with an NPS approved guide. In addition to these restrictions,

alternative 3 calls for the elimination of snowmobile use in the park after the Presidents' Day weekend. As in the alternative 2 analysis of the socioeconomic impacts, two scenarios are presented: 1) one scenario assumes that 59.6% of the excess snowmobile demand at the West Entrance will be lost (these visitors will choose not to make a trip to the park), and 2) a second scenario assumes that excess snowmobile demand will be shifted so that all winter season days will have a maximum of 330 snowmobiles using the West Entrance and 59.6% of the aggregate excess snowmobile demand above that level will be lost. The results of these two scenarios are presented as impact ranges in the analysis below.

GYA Regional Economy. Based on the detailed winter use data for YNP collected during the 1997-98 winter season, placing a cap of 330 snowmachines allowed per day through the West Entrance to the park would lead to 17.6% decrease in park visitation under the assumption that no use is shifted to off-peak days, and a decrease of 13.6% in visitation assuming that all days have 330 snowmobiles using the West Entrance.

In the winter visitor survey, park visitors who reside outside of the 5-county area made up 85.9% of total sampled visitors. If between 13.6% and 17.6% of these non-five county resident visitors decided not to recreate within the GYA because of the West Entrance restrictions, the local economy would lose these potential visitors' local-area expenditures.

Based on this estimated visitation loss and the IMPLAN input/output model, it is estimated these snowmobile entry restrictions would reduce the total economic output in the 5-county GYA area by between \$8,600,000 and \$11,100,000. Additionally, it is estimated that between 203 and 262 jobs within the five counties would be lost due to reduced nonresident expenditures in the area.

While the high estimate loss of \$11,100,000 in output is a minor impact on the overall 5.7 billion economic output of the five counties, this impact will likely be concentrated in small communities near the parks.

3-State Regional Economy. As noted above, it is estimated that placing a cap of 330 snowmachines allowed per day through the West Entrance to the park (among other restrictions) would lead to 17.6% decrease in park visitation under the assumption that no use is shifted to off-peak days, and a decrease of 13.6% in visitation assuming that one-half of the excess demand is shifted to off-peak days.

In the winter visitor survey, park visitors who reside outside of the 3-state region made up 65.5% of total sampled visitors. If between 13.6% and 17.6% of these non-three state

resident visitors decide not to recreate within the GYA because of the West Entrance restrictions, the local economy would lose these potential visitors' local-area expenditures.

It is estimated that a loss of the regional expenditures by these nonresidents would lead to an overall reduction of between \$9,500,000 and \$12,300,000 in total economic output and between 230 and 299 jobs in the 3-state area. This is a negligible negative impact in the context of the regional 3-state economy. This estimated reduction would be lessened to the extent that nonresidents would choose to recreate at other locations within the 3-state region instead of in the GYA. The extent of any such substitution behavior is unknown.

Town of West Yellowstone. The FEIS provided estimates of output and employment impacts on both the 5-county GYA area and the 3-state region. The SEIS presents impacts on the gateway community of West Yellowstone, MT in addition to the 5-county and 3-state estimates. Overall, the direct spending impacts associated with alternative 3 are estimated to be approximately 45% of the impacts associated with the 5-county area. The total expenditure impacts for West Yellowstone will be a smaller percentage of the 5-county total impacts (that is, smaller than 45%) because West Yellowstone likely has a significantly smaller expenditure multiplier than the 1.60 multiplier derived for the 5-county area.

Based on available information and survey data it appears that, consistent with the conclusions in the FEIS, a majority of the 5-county impacts would be felt by the local West Yellowstone economy. Further, the output and employment impacts on West Yellowstone would represent a much larger percentage of total annual economic activity than did the estimated impacts for the larger, more economically diverse 5-county area.

Social Values. Most winter visitors surveyed support mechanized access to the parks. In the context of overall access to the park, the changes proposed in alternative 3 are likely to result in moderate to major local adverse impacts by limiting use to 330 snowmobiles per day at the West Entrance. Conversely, a portion of winter users favor reductions in motorized use within the park. For this group the alternative 3 travel restrictions would have a positive impact.

The current winter visitors to YNP are those who are attracted by the current set of opportunities, which include snowmobiling. These visitors support the past policy. Among summer visitors (as detailed in Chapter III of the FEIS), there is less support for the past policy of allowing snowmobiles. Among the general public, local residents are evenly divided between the existing and past policies. However, this probably varies by county. For

example, the Teton County, WY survey (discussed in Chapter III of the FEIS) found a much higher overall participation among locals in cross-country skiing (mostly in GTNP) than snowmobiling. A majority of local residents feel that snowmobiles negatively impact Yellowstone in the winter and that snowmobiles should be limited in YNP in winter. Among the regional and national populations a plurality of respondents favor the snowcoach option over the past policy. For this group, alternative 3 would be more positive than alternative 2.

The potential for a shift in the type of winter recreation activity supported by YNP is indicated by relative participation rates. For example, nationally, regionally and locally cross-country skiing is just as, or slightly more, popular than snowmobiling.

Nonmarket Values. Alternative 3 potentially would impact nonmarket values of winter visitors through a reduction in current winter user visitation resulting from the restriction of mechanized travel to clean, quiet snowcoaches.

Based on the winter visitor survey, the nonmarket value of a trip to GYA parks is \$91. It is estimated that park visitation would be reduced by between 13.6% and 17.6% resulting from the alternative. Based on current winter visitation levels, these estimated reductions in visitation would translate into between a \$1,200,000 and \$1,550,000 reduction in the aggregate nonmarket value of winter trips to the parks. This is a minor adverse impact. These estimates are based on reduced use by current visitors.

Conclusion

Alternative 3 management actions would have a negligible to minor negative impact on the 5-county economy and a negligible negative effect on the 3-state economy through changes in visitation and nonresident visitor expenditures. Alternative 3 also would have a minor negative impact on total current trip nonmarket visitor benefits (through reduced visitation). The changes proposed in alternative 3 are likely to result in minor to moderate local adverse impacts to some visitors' social values and a minor to moderate positive impact on other users' social values.

THE EFFECTS OF IMPLEMENTING THE ALTERNATIVES ON PUBLIC HEALTH AND SAFETY

Methods

The following types of information were used to assess the level of impacts on public safety:

- **Case Incident Reports (CIRs):** These reports are filed when rangers are summoned to a specific location. For YNP, CIRs related to winter use were compiled and the number of CIRs per recreation type was computed for the December 1995 to April 2001 winter seasons (Wondrak 1998, rev. 1999, 2000, and 2001). For GTNP and the Parkway, information related to CIRs was obtained from park dispatch.
- **Emergency Medical Services (EMS) Reports:** These reports are filed when rangers assist in medical emergencies. For YNP, EMS reports related to winter use were compiled and the number of reports per recreation type was computed for the December 1995 to April 2001 winter seasons (Wondrak 1998, rev. 1999, 2000, and 2001). For GTNP and the Parkway, information related to EMS reports was obtained from park dispatch.
- **Motor Vehicle Accidents (MVA) Reports:** For YNP, information was obtained from a report that detailed the number and type of MVAs that occurred in the winter use seasons from December 1995 to April 2001 (Wondrak 1998, rev. 1999, 2000, and 2001). Accidents that occurred on US Highway 191 were excluded. For GTNP and the Parkway, information related to MVAs was obtained from park dispatch. Accidents that occurred on US Highway 191/26/89 south of Moran Junction were excluded.
- **Citations:** For YNP, information was obtained from a report that detailed the number and type of citations that were issued by rangers in the winter use seasons from December 1995 to April 2001 (Wondrak 1998, rev. 1999, 2000, and 2001). Citations issued on US Highway 191 were excluded. For GTNP and the Parkway, information related to citations was obtained from park dispatch.

Chapter III of this document describes in detail the above reports.

The information used to assess the level of impacts on public health is contained in the analysis of air quality impacts relative to National Ambient Air Quality Standards. The standards for NAAQS pollutants are predicated on the level of pollution deemed under the law to be harmful to those with respiratory illnesses or are otherwise susceptible to pollutants.

Table 36. Definition of impacts to public health and safety.

Impact Category	Definition
Negligible Effect	The impact to public health and safety is not noticeable or perceptible.
Minor Effect	The impact to public health and safety is measurable or perceptible, and is limited to a relatively small number of winter use visitors at localized times.

Impact Category	Definition
	Impacts to public safety may be realized through a minor increase or decrease in the potential for visitor conflicts in current accident areas. Impacts to public health are interpreted as of low risk to public health because NAAQS are never exceeded, but may be approached in few local areas.
Moderate Effect	The impact to public health and safety is sufficient to cause a permanent change in accident rates at existing low accident locations or create the potential for additional visitor conflicts in areas that currently do not exhibit noticeable visitor conflict trends. Impacts to public health are interpreted as of moderate risk to public health because NAAQS are regularly approached, and may be exceeded occasionally at peak use times in local areas.
Major Effect	The impact to public safety is substantial either through the elimination of potential hazards or the creation of new areas with a high potential for serious accidents or hazards. Impacts to public health are interpreted as a major risk to public health because NAAQS are regularly exceeded in local areas.

The Effects of Implementing Alternative 1a on Public Health and Safety

Under alternative 1a, late night oversnow travel would be prohibited from 9:00 P.M. to 8:00 A.M. in all three parks. This action would eliminate any potential for collisions during those hours between oversnow motorized vehicles and wildlife (although the effect of this action would be negligible because less than 1% of recorded accidents during the last three years have occurred in the time period from 11 P.M. to 5 A.M). The primary benefit to public safety would be that all potential for snowmobile accidents, as well as snowmobile/snowcoach conflicts, would be removed. Also, because snowcoach drivers generally have more familiarity with the roads and wildlife patterns than the casual visitor, the elimination of private snowmobiles would reduce the overall potential for accidents (snowcoaches are involved in less than 3% of accidents). In addition, this alternative eliminates the potential for inter-modal conflicts between different types of oversnow motorized vehicles and facilitates nightly grooming, which is also a benefit to safety.

Because large numbers of snowmobiles would not be staged at park entrances, effects to public health related to high levels of NAAQS pollutants would be virtually nonexistent.

In GTNP closing the road between Colter Bay and Flagg Ranch to wheeled-vehicles (starting the winter of 2008-2009) would eliminate the potential for inter-modal conflict along this stretch of the CDST. It would eliminate a major source of winter vehicle accidents, vehicle-wildlife accidents and unsafe vehicular activity. Elimination of snowmobiles from the surface of Jackson Lake would also eliminate the potential for accidents involving poor ice on the lake's frozen surface.

Conclusion

Conclusions described in the FEIS on page 413 remain valid. The benefits of implementing this alternative would be beneficial, major and long term due to the elimination of all potential snowmobile accidents in the three parks. High levels of NAAQS pollutants would not be not likely to occur, therefore members of the public who are susceptible to respiratory problems would not be affected. Associated effects would be none to negligible (also see *Effects of Implementing the Alternatives on Air Quality*).

The Effects of Implementing Alternative 1b on Public Health and Safety

All effects described under alternative 1a remain unchanged. The principal difference between alternatives 1a and 1b is that under alternate 1b, implementation would be delayed one year. Consequently, snowmobiles would be phased out by 50% beginning 2003-2004, and beginning 2004-2005 access would be limited to snowcoaches only. Therefore the beneficial effects of the alternatives would be delayed one year.

The Effects of Implementing Alternative 2 on Public Health and Safety

Nighttime oversnow travel would be prohibited from 8:00 P.M. to 7:30 A.M. (8:30 A.M. for snowmobiles through the West Entrance). This action would reduce the potential for nighttime collisions. Despite the more restrictive travel hours relative to alternative 1a, effects related to collisions would increase due to the presence of snowmobiles (which account for 97% of all oversnow-related accidents in the parks). Although rare, accidents on the CDST would continue to occur, and due to automobiles and snowmobiles traveling in close proximity, safety on this route would remain a concern, as would the poor condition of some of the groomed routes. Snowmobile access on Jackson Lake would be permitted, and hazards associated with that activity would be present. To mitigate the potential for accidents, this alternative would lower the speed limit to 35 mph from the West Entrance to Old Faithful and would increase ranger patrols to strictly enforce speed limits and other travel regulations. Furthermore, visitor safety would be discussed at optional orientation briefings held in the gateway communities.

Visitor exposure to exhaust and sound would continue, although cleaner and quieter technology would help to mitigate this exposure. Other mitigation measures include removing the peak days from the West Entrance and requiring pre-paid entrance permits. An increase in use levels at other gates may increase visitor exposure at those entrances to snowmobile exhaust and sound.

Conclusion

Adverse effects on public safety would be increased relative to alternative 1a due to the presence of snowmobiles. Alternative 2 would result in minor adverse impacts to visitor and employee safety along the road from West Yellowstone to Old Faithful and along the CDST, and negligible adverse impacts on less heavily traveled routes. Safety concerns for winter visitors who utilize the East Entrance would be minor to moderate and adverse.

Where high levels of NAAQS pollutants occur, visitors who are susceptible to respiratory problems would likely be adversely and moderately affected. High levels occur at times and places where large numbers of oversnow vehicles stage for entry into the parks, and pose the most problem at the West Entrance to YNP. Cleaner machines would result in fewer effects than currently, but increased numbers of snowmobiles may offset any gained benefits (also see *Effects of Implementing the Alternatives on Air Quality*).

The Effects of Implementing Alternative 3 on Public Health and Safety

Similar to alternative 2, effects on public safety would be increased relative to alternative 1a due to the presence of snowmobiles. However, under alternative 3, snowmobiles would be fewer in number and use would be distributed to alleviate congestion along the more popular routes. Consequently, the potential for accidents would potentially decrease relative to alternative 2. The elimination of snowmobiles on Jackson Lake and the shared automobile/snowmobile traffic from Colter Bay to Flagg Ranch would also serve to increase public safety. The requirement that a permitted guide must accompany snowmobilers in YNP would enhance safety through increased adherence to speed limits and other travel regulations, as would the prohibition on late night travel from 8:00 P.M. to 7:30 A. M.

Cleaner and quieter technology enforced through concession contracts and reduced snowmobile numbers would reduce visitor exposure to pollutants and sound.

Conclusion

Alternative 3 would result in negligible to minor adverse impacts to visitor safety along the road from West Yellowstone to Old Faithful. Safety would be increased on the CDST due to the elimination of the shared corridor from Colter Bay to Flagg Ranch, and effects would be negligible and adverse along this route. Safety concerns for winter visitors who utilize the East Entrance would be minor to moderate and adverse. Where high levels of NAAQS pollutants occur, visitors who are susceptible to respiratory problems would likely be

adversely and moderately affected but to a lesser degree than alternative 2 (also see *Effects of Implementing the Alternatives on Air Quality*).

THE EFFECTS OF IMPLEMENTING THE ALTERNATIVES ON EMPLOYEE HEALTH AND SAFETY

Methods

To assess the level of impact to employee health and safety under each alternative, the following types of information were used:

- Reports from employees and commercial guides;
- Reports submitted to NPS from OSHA (Occupational Safety and Health Administration) and NIOSH (National Institute for Occupational Safety and Health) documenting the hazards to employees from working with the current mix of winter transportation in YNP;
- Results of air monitoring near the West Entrance in YNP; and
- A review of infractions that are associated with unsafe snowmobiling behaviors; and
- Anecdotal reports by employees related to observed unsafe snowmobiling behaviors.

Table 37. Definition of impacts to employee health and safety.

Impact Category	Definition
Negligible Effect	The impact to employee health and safety is not noticeable or perceptible.
Minor Effect	The impact to employee health and safety is measurable or perceptible, and is limited to a relatively small number of winter use visitors at localized times. Impacts to employee safety may be realized through a minor increase or decrease in the potential for visitor conflicts in current accident areas. Impacts to employee health are interpreted as of low risk if NAAQS are never exceeded, but are approached infrequently in few local work areas.
Moderate Effect	The impact to employee health and safety is sufficient to cause a permanent change in accident rates at existing low accident locations or create the potential for additional visitor conflicts in areas that currently do not exhibit noticeable visitor conflict trends. Impacts to employee health are interpreted as of moderate risk because NAAQS are regularly approached, and may be exceeded occasionally at peak use times where employees live or work.
Major Effect	The impact to employee safety is substantial either through the elimination of potential hazards or the creation of new areas with a high potential for serious accidents or hazards. Impacts to employee health are interpreted as a major risk because NAAQS are regularly exceeded where employees live or work.

The Effects of Implementing Alternative 1a on Employee Health and Safety

A reduced number of vehicles (snowcoaches only) would be entering through the West Entrance, consequently rangers would not have to patrol outside of the booth to check for underage drivers and valid passes. Therefore, exposure to pollutants and sound at the West Entrance would be significantly reduced. Additionally, fewer numbers of oversnow vehicles on the roads would help to maintain a smoother road surface and reduce the number of needed ranger patrols. This would minimize injuries to employees caused by the jarring of a bumpy road surface. Employees would also not be exposed to unsafe operation of snowmobiles.

The East Entrance would remain open, therefore employees would still be exposed to the hazards of avalanche control.

Conclusion

The benefits of implementing this alternative would be beneficial, moderate and long term due to the elimination of all potential snowmobile accidents in the three parks. Avalanche control operations would continue to pose adverse, major threats to employee safety at the East Entrance of YNP. Effects related to high levels of NAAQS pollutants would be negligible. Employees who are susceptible to respiratory problems would not likely be affected by this alternative. Relative to the existing condition, there would be a moderate beneficial long term impact in reducing pollutants (also see *Effects of Implementing the Alternatives on Air Quality*).

The Effects of Implementing Alternative 1b on Employee Health and Safety

All effects described under alternative 1a remain unchanged. The principal difference between alternatives 1a and 1b is that under alternate 1b, implementation would be delayed one year. Consequently, snowmobiles would be phased out by 50% beginning 2003-2004, and beginning 2004-2005 access would be limited to snowcoaches only.

The Effects of Implementing Alternative 2 on Employee Health and Safety

Snowmobiling would continue in this alternative at levels similar to current use. Although peak days would not occur at the West Entrance, other entrances would have increased use levels. Because NPS would be required to enforce the cleaner and quieter technology requirement thereby requiring law enforcement to monitor snowmobiles entering the gates, employee exposure to exhaust and sound would continue. Cleaner and quieter technology would help to mitigate this exposure. Removing the peak days from the West Entrance and

requiring pre-paid entrance permits would also partly mitigate entrance staff exposure to pollutants and sound at this gate. An increase in use levels at other gates will add to the time employees at those entrances are exposed to snowmobile exhaust and sound. Due to the number of snowmobiles, road bumps are still likely to appear on most routes. Because this alternative entails an increase in ranger patrol, the risk of injuries due to the jarring of the bumpy roads would increase. Employees would continue to be exposed to unsafe operation of snowmobiles, however the increased ranger presence, slower speed limit, prohibition on late night travel, and the optional visitor orientation program would reduce this hazard.

The East Entrance would remain open, so employees would still be exposed to the hazards of avalanche control.

Conclusion

Because snowmobiles would be allowed in the parks, effects would increase relative to alternative 1a. Effects would be adverse and minor from the West Entrance to Old Faithful and on the CDST, and adverse and negligible on the less heavily traveled routes in the parks.

Adverse effects associated with avalanche control would be the same as alternative 1a.

Unsafe snowmobiling practices would continue to pose adverse, moderate effects to park employees. Increased ranger patrols, slower speed limits and a prohibition on late night travel may mitigate these effects.

For employees who patrol/work on high-traffic, bumpy roads, effects would be adverse and moderate.

Where high levels of NAAQS pollutants occur, employees who are susceptible to respiratory problems would likely be adversely affected. Overall impacts would be minor to moderate. High levels occur at times and places where large numbers of oversnow vehicles stage for entry into the parks. Cleaner machines would result in fewer effects than currently, but increased numbers of snowmobiles may offset any gained benefits. As the number of snowmobiles are reduced through the phase-in period, this impact would decline (see *Effects of Implementing the Alternatives on Air Quality*).

Effects to employee hearing would be adverse and minor due to quieter machines.

The Effects of Implementing Alternative 3 on Employee Health and Safety

Cleaner and quieter technology enforced through concession contracts and reduced snowmobile numbers would reduce the need for monitoring at the gate. Employee exposure

to pollutants and sound would be minimized. Snowmobile numbers would be low enough to minimize poor road conditions and the jarring effect. Education through guides and the lower snowmobile numbers would also greatly minimize employee exposure to unsafe snowmobile operation.

The East Entrance would remain open, so employees would still be exposed to the hazards of avalanche control.

Conclusion

Because snowmobiles would be allowed in the parks under alternative 3, effects would increase relative to alternative 1a. From the West Entrance to Old Faithful, effects would be adverse and negligible to minor. On the CDST from Colter Bay to Flagg Ranch, effects would be beneficial due to the elimination of the shared corridor. Effects may be mitigated by the prohibition on late night travel, reduced snowmobile numbers, and a reduction in snowmobile numbers.

Adverse effects associated with avalanche control would be the same as alternative 1a.

Effects related to unsafe snowmobiling practices would be none to negligible due to the mandatory use of permitted guides and the mitigation measures discussed above.

Where high levels of NAAQS pollutants occur, employees who are susceptible to respiratory problems would likely be adversely affected (although to a lesser degree than alternative 2). Overall levels of impact would be minor to moderate (also see *Effects of Implementing the Alternatives on Air Quality*).

THE EFFECTS OF IMPLEMENTING THE ALTERNATIVES ON AIR QUALITY AND AIR QUALITY RELATED VALUES

The focus of analysis in this draft SEIS is on modeled production of emissions from recreational, oversnow motorized vehicles for each alternative. There has not been sufficient time available to date in which to complete the modeling of visibility impacts or to complete a PSD (prevention of significant deterioration) increment analysis recommended by the EPA. Both analyses are viewed by NPS as important in disclosing impacts on air quality. These analyses will be incorporated into the final SEIS.

Summary of Changes in Impacts Between FEIS and SEIS

Specific impact estimates were calculated for the SEIS alternatives, corresponding to estimates for seven alternatives evaluated in the FEIS. For purposes of comparison SEIS

estimates are displayed below along with modeled results from alternatives A, B and D from the FEIS. Alternative A represents existing conditions and management, prior to implementation of the current decision. Alternatives B and D both prescribed objectives for cleaner snowmobiles to address issues relating to air quality.

Table 38: Modeled air quality impacts for SEIS alternatives compared to selected FEIS alternatives.

SEIS and FEIS Alternatives	Analysis Area	1-Hr CO (ppm)	Δ in CO from Existing	24-hour PM ₁₀ (μgrams/m ³)	Δ in PM ₁₀ from Existing
FEIS Alternative A (Existing Condition - prior to implementing the current decision)	West Yellowstone:	32.2	0%	68.2	0%
	West Entrance to Madison	14.8	0%	33.7	0%
	Flagg Ranch	4.72	0%	6.0	0%
SEIS Alternatives 1a and 1b (after full implementation)	West Yellowstone:	4.5	-86%	23.4	-66%
	West Entrance to Madison	1.15	-92%	5.4	-84%
	Flagg Ranch	2.0	-58%	5.17	-14%
SEIS Alternative 2 (after year 3 at full implementation)	West Yellowstone:	7.9	-75%	40.9	-40%
	West Entrance to Madison	2.4	-84%	12.0	-19%
	Flagg Ranch	1.55	-45%	2.3	-51%
SEIS Alternative 3 (after year 2 at full implementation)	West Yellowstone:	5.8	-82%	24.6	-64%
	West Entrance to Madison	1.45	-90%	5.4	-84%
	Flagg Ranch	0.77	-84%	5.04	-16%
FEIS Alternative B (by 2008-2009)	West Yellowstone:	6.3	-80%	23.6	-65%
	West Entrance to Madison	3.7	-75%	23.6	-30%
	Flagg Ranch	4.19	-11%	5.18	-14%
FEIS Alternative D (by 2008-2009)	West Yellowstone:	20.6	-36%	34.7	-49%
	West Entrance to Madison	10.1	-32%	25.8	-23%
	Flagg Ranch	4.08	-14%	5.22	-13%

Methods and Assumptions

In order to assess the relative impacts of the proposed winter use alternatives on ambient air quality in the GYA, short term air quality analyses were performed by means of atmospheric dispersion modeling for carbon monoxide (CO) and particulate matter (PM₁₀). The

alternatives that are identified in this document are summarized in the following section. In addition to the air quality modeling, the winter season total mobile emissions of CO, PM₁₀, nitrogen oxides (NO_x), and hydrocarbons (HCs) inside the park units were calculated for each scenario and vehicle type.

Alternatives - Review and Assumptions Relevant to Modeling

Alternative 1a, No Action, is the same as the current decision. In terms of final implementation, it is the same as Alternative 1b, which would delay implementation by one year. Alternative 1b is addressed in detail below.

Under alternative 1b, only snowcoaches would travel in the three park units beginning in the 2004-2005 winter season. Because this alternative is essentially the same as alternative G (the Preferred Alternative presented in the FEIS) the snowcoach emission factors analyzed were also the same. Estimated snowcoach use levels are presented in Appendix A of the HMMH noise analysis report. The full implementation season of alternative 2 is year 3 (2004 – 2005 winter season). Year 1 (2002 – 2003 winter season) is characterized by the existing use, and year 2 is characterized by a 50% reduction in snowmobile entries at the West Yellowstone Entrance.

Alternative 2 contains several scenarios to accommodate the phase-in schedule for different vehicle types. For rental and outfitter snowmobiles (70% of existing snowmobile fleet use) from year 1 (2002-2003 winter season) forward, only 4-stroke engine snowmobiles and other models whose engine family meets an emission standard of 200 g/kW-hr (149 g/hp-hr) for CO and 75 g/kW-hr (56 g/hp-hr) for hydrocarbons (HC) would be allowed in the park units. This represents the proposed 2010 U.S. Environmental Protection Agency (EPA) emission rule for snowmobiles and constitutes a 50% reduction over current snowmobile emissions (Federal Register 2001). The proposed rule also notes that “limits on HC emissions will serve to simultaneously limit PM₁₀.”

For public snowmobiles (30% of the snowmobile fleet) for years 1 and 2 (2002-2003 and 2003-2004 winter seasons), only 4-stroke snowmobiles and 2-stroke engine models using Bio-Base Fuels (10% ethanol blend fuel and full synthetic low-emission oil) would be allowed in the park units. For year 3 (2004-2005 winter season) and beyond, only 4-stroke snowmobiles and other models whose engine

monitoring. The snowmobile emission factors under alternative 2 were derived from new Arctic Cat® 4-stroke snowmobile engine test data. The vehicle use levels are presented in Appendix A. The full implementation date of alternative 2 is year 2 (2003 – 2004 winter season), and year 1 (2002–2003 winter season) is characterized by the existing use.



Figure 8. Yellowstone National Park.

Air Quality Modeling Inputs

Modeling Locations and Procedures

Figure 7 notes the general park areas, and Figure 8 notes some of the areas of interest in Yellowstone National Park. Six locations noted in Table 39 were selected for the air quality modeling analyses based on their characteristics and vehicle mix by alternative. Prior to initiating the air quality modeling, a modeling protocol was prepared (EA 2001). As noted in the protocol, for each alternative, the worst-case maximum ambient concentrations of carbon monoxide (CO) and particulate matter (PM₁₀) were estimated using EPA-approved

air quality models for four pre-defined vehicle fleets operating in six locations. For the West Yellowstone Entrance and the roadway links, the EPA model CAL3QHC (EPA 1995a) was used to predict the worst-case maximum 1-hr average concentrations of CO and PM₁₀.

Table 39. Selected locations for modeling application and vehicle mix by alternative.

Location	Type	Vehicle Mix		
		Alternatives 1a & 1b	Alternative 2	Alternative 3
West Yellowstone Entrance Station	Fee Collection Booths	Snowcoach travel only	Snowcoach and snowmobile travel only	Snowcoach and snowmobile travel only
Old Faithful	Staging Area	Snowcoach travel only	Snowcoach and snowmobile travel only	Snowcoach and snowmobile travel only
Flagg Ranch	Staging Area	Snowcoach travel only	Snowcoach and snowmobile travel only	Snowcoach and snowmobile travel only
Mammoth to Northeast Entrance	Plowed Highway	Wheeled vehicle travel only	Wheeled vehicle travel only	Wheeled vehicle travel only
West Entrance to Madison	Groomed Motorized Route	Snowcoach travel only	Snowcoach and snowmobile travel only	Snowcoach and snowmobile travel only
Flagg Ranch to Colter Bay	Groomed Motorized Trail/Plowed Road	Snowcoach travel only	Snowcoach and snowmobile travel only	Snowcoach and snowmobile travel only

Furthermore, persistence factors (0.7 for 8-hr average and 0.4 for 24-hr average) were applied to the maximum 1-hr average concentrations to calculate the maximum 8-hr average CO concentrations and 24-hr average PM₁₀ concentrations. For the staging areas, the EPA model ISCST3 (EPA 1995b) was used to predict the maximum 1-hr and 8-hr average CO concentrations and maximum 24-hr average PM₁₀ concentrations.

The predicted maximum concentrations of CO and PM₁₀ imparted to traffic conditions of the proposed alternatives were then compared to those of the full implementation scenario of alternative 2 (i.e., year 3 2004 -2005) in order to determine the amount and direction of changes in maximum CO and PM₁₀ concentrations. The contribution of each vehicle type to the generation of CO and PM₁₀ also was assessed for each scenario.

Emission Factors

A composite running emission factor in grams per vehicle-mile for each free flow link and an idle emission factor in grams per vehicle-hour for each queue link and for the staging areas were required. For the full implementation of alternative 1b (2004-2005 winter season), the snowcoach emission factors were obtained from the Preferred Alternative of the FEIS. They represented the emission factors of model year 2000 light duty gasoline trucks (LDGT) and are summarized in Table 40.

Table 40. Snowcoach emission factors used in alternative 1a year 3 and beyond.

Vehicle Type	Traveling Emission Factor (g/mile)		Idle Emission Factor (g/hr)	
	CO	PM ₁₀	CO	PM ₁₀
2000 LDGT (at 10 mph)	109.9	0.073	487	NA
2000 LDGT (at 35 mph)	67.52	0.055	487	NA

For the rental and outfitter snowmobiles in alternative 2, the snowmobile emission factors for HC and CO were derived from the proposed 2010 EPA snowmobile emission rule, while that for NO_x was derived from the EPA NONROAD model (EPA 2000) emission factor, and that for PM₁₀ was assumed to be 50% of the NONROAD factor. For the public snowmobiles with 2-stroke engines using bio-base fuel and synthetic oil, the snowmobile emission factors for all pollutants were derived from the NONROAD 2-stroke snowmobile emission factors. In year 2, the snowmobile emissions for HC and CO were derived from the proposed 2010 EPA snowmobile emission rule. Note that the 50% reduction in PM₁₀ emission factors assumed for some scenarios are based on the assumption that PM₁₀ emissions will decrease in a manner directly proportional to HC. These emission factors are presented in Tables 41 and 42.

Table 41. Snowmobile traveling emission factors for alternatives 2 and 3.

Alternative	YEAR	User	Composite Emission Factor (g/hp-hr)			
			HC	NO _x	CO	PM ₁₀
2	2002-2005	Rentals and Outfitters	56 ¹	3.497 ³	149 ¹	1.35 ⁵
		General Public	110 ³	0.86 ³	300 ³	2.7 ³
	2005-2006 and later	All	56 ¹	3.497 ²	149 ¹	1.35 ⁵
3	2003-2004 and later	All	4.71 ⁴	14.32 ⁴	50.86 ⁴	0.06 ²

1 EPA 2010 snowmobile emission factor proposal

2 EPA Nonroad 4-stroke snowmobile NO_x and PM₁₀ emission factor

3 EPA Nonroad 2-stroke snowmobile emission factor

4 Arctic Cat® 4-stroke prototype snowmobile emission factor

5 50% decrease of the existing 2-stroke level assumed

Table 42. Snowmobile idle emission factors used for Alternatives 2 and 3.

Alternative	Year	User	Idle Emission Factor (g/hr)			
			HC	NO _x	CO	PM ₁₀
2	2002-2005	Rentals and Outfitters	403 ¹	0.15 ¹	258 ¹	2.05 ¹
		General Public	806 ²	0.3 ²	516 ³	4.10 ³
	2005-2006 and later	All	403 ¹	0.15 ¹	258 ¹	2.05 ¹
3	2003-2004 and later	All	10 ⁴	0.65 ⁴	29 ⁴	0.09 ⁵

1 50 percent decrease of the existing 2-stroke level assumed

2 SWRI 1999 2-stroke Polaris baseline

3 As used in the FEIS, derived from SWRI 2-stroke snowmobile test (1999)

4 Arctic Cat® 4-stroke prototype

5 Surrogate idle obtained by applying the PM₁₀ composite emission factor ratio of the existing condition (2.7 g/hp-hr - Nonroad 2-stroke) to the Arctic Cat® composite emission factor (0.06 g/hp-hr - Nonroad 4-stroke) to the existing 2-stroke idle emission factor (4.1 g/hr). (0.06 g/hp-hr / 2.7 g/hp-hr)*4.1 g/hr = 0.09 g/hr.

For alternative 3, the snowmobile CO and HC emission factors were based on the latest Arctic Cat® 4-stroke snowmobile engine emissions test data, and the PM₁₀ emission factor was derived from the EPA Nonroad 4-stroke snowmobile PM₁₀ emission factors. These snowmobile emission factors also are presented in Tables 41 and 42. Since the snowmobile traveling emission factors are expressed in g/hp-hr, a conversion to g/mile was necessary. This was done using the following formula:

$$(\text{g/mile}) = (\text{g/hp-hr}) \times (\text{weighted average load}) \times (\text{load factor}) / (\text{vehicle speed})$$

The weighted average load is 48 hp for 2-stroke engine, the weighted average of the EPA Nonroad snowmobile population for Wyoming and Montana, and 45 hp for 4-stroke engines (Arctic Cat® data). A load factor of 0.34 also was assumed (EPA 2000c). The snowmobile idle emission factors were obtained directly from the mode 5 emission factor values of the snowmobile engine test mentioned in Tables 41 and 42. Moreover, calculated results from these data area conservative because deterioration rates were not applied to the emission factors in the present study because there were no applicable data available for snowmobiles or snowcoaches.

The wheeled vehicles emission factors were obtained from the FEIS and are summarized in Table 43. The traveling emission factors for CO were estimated from AP-42 Volume II (EPA, 1998), and the traveling emission factors for PM₁₀ were estimated from the EPA emission factor model PART5 (EPA 1995c). The idle emission factors were derived from the idling vehicle emissions publications (EPA 1998). Since gasoline-fueled vehicle idle PM₁₀ emissions are negligible, they were set to 0.001 g/hr in the modeling inputs.

Table 43. Wheeled vehicle emission factors.

Type	Traveling CO	Traveling PM ₁₀	Traveling NOx	Traveling HC
	(g/mile) @ 35 mph			
Automobile	42.03	0.056	2.27	3.88
Light Truck	67.52	0.074	2.98	5.85
Heavy Truck	10.57	0.932	9.27	3.06
Tour Bus	10.57	0.778	1.17	0.51
Shuttle Van	67.52	0.074	2.98	5.85

Traffic Characteristics

Traffic counts from a February 2000 West Yellowstone Entrance monitoring project (NPS 2000a) indicated that the period between 9 A.M. and 10 A.M. represented the peak traffic hour and that on average 309 snowmobiles entered the park at that location during that time period. The average total daily entrance was 923 snowmobiles. This implies that approximately 33.5% of the snowmobiles entered the park during the peak hour. The winter motorized use scenarios indicate that the ratio of the average mean daily use to the average peak day use of snowmobiles is 0.57 for the existing conditions. Assuming that these percentages hold true for each alternative and each vehicle type, the peak hourly traffic volume (PHTV) may be calculated as $PHTV = AMDU * 0.33 / 0.57$, where AMDU is the average mean daily use. For the West Yellowstone Entrance, PHTV would be multiplied by

the lane ratios (vehicles per lane/peak vehicle number). From the monitoring project data, these ratios are 0.22, 0.16, and 0.62 for lane 1, lane 2, and lane 3, respectively. For the staging areas, it was assumed that 20% of all vehicles are idling. The peak hourly traffic volumes for each vehicle type and for each alternative are presented in Appendix B of the draft air quality analysis report (EA 2001).

Videotapes recorded during the monitoring project indicated that the average idle time length is about 30 seconds and the average approach speed is about 10 mph for the West Yellowstone Entrance. Even though the third lane was designed to be free flowing, it was observed that, on average, motorists idle for a very short time of about five seconds. However, for alternative 1b, it was assumed that no express lane exists and that all lanes have the same idle time of 30 seconds. The average vehicle speed was 35 mph on the parks' roadways.

Meteorology

For the CAL3QHC modeling, meteorological conditions included low wind speed of 1.0 meter/second, stable atmosphere (class 6), and low mixing height of 50 meters. The latter was derived from the average morning mixing height data for the Jackson Hole Airport for the months of January and February 2000 (National Climatic Data Center data). The hourly surface and upper air meteorological data required by ISCT3 were processed from the Jackson Hole Airport data for the 1999 - 2000 winter months. A surface roughness of 283 cm representing a fir forest was selected. Furthermore, for PM_{10} modeling, a settling velocity and deposition velocity of 0.5 cm/s were selected (Zannetti 1990).

The ambient background concentrations of CO and PM_{10} were estimated following the guidelines of 40 CFR 51, Appendix W. For the West Entrance, the available monitoring data collected from January 12 to March 28, 1995 in the town of West Yellowstone (NPS 1996) were used. The background concentrations were estimated to be 3.0 ppm for the 1-hr average CO and $23.0 \mu\text{g}/\text{m}^3$ for the 24-hr PM_{10} . The calculated 8-hr average CO background concentration is 2.10 ppm. For locations inside the park, the PM_{10} background concentrations at the staging areas were integrated from the Interagency Monitoring of Protected Visual Environments (IMPROVE) network aerosol data and were estimated to be $5.0 \mu\text{g}/\text{m}^3$. However, since there are no CO monitors inside the parks, the ratio of the PM_{10} background concentrations at the West Entrance and inside the park was conservatively applied to the West Entrance CO background concentration to determine the inside-the-park

CO background concentration. This yielded 1-hr average and 8-hr average CO background concentrations of 0.65 ppm and 0.46 ppm, respectively, inside the park.

Direct and Indirect Effects of Implementing the Alternatives on Air Quality

West Yellowstone Entrance

The West Yellowstone Entrance is characterized by two fee collection booths where snowmobiles and snowcoaches idle when passing through. This creates stop-and-go, delay, and queuing traffic conditions. Also, an express lane exists at a third booth in which traffic is designed to be free flowing. To model the air quality impact of these traffic conditions, the EPA air quality model CAL3QHC was used. CAL3QHC predicts 1-hour average concentrations of inert pollutants from both moving and idling motor vehicles at roadway intersections. It includes the line source dispersion model CALINE3 (Benson, 1979) and a traffic algorithm for estimating vehicular queue lengths at signalized intersections. Even though the West Yellowstone Entrance is not a signalized intersection, it presents the characteristics of one (delay approach, idle, and acceleration).

CAL3QHC requires meteorological, site geometry, traffic, and emission parameters as critical inputs. A referential system with origin at the second fee collection booth was used to allocate the end points of the links and the receptor locations. Nine links representing the approach, queue, and departure links of each of the three lanes were defined. The end point coordinates of the links extend up to 1,000 ft for each link. Ten receptors were located outside the mixing zone, 200 feet apart along the northern and southern side of the entrance. The composite CO and PM₁₀ peak hourly traveling and idle emission factors were calculated based on the emission factors presented in Tables 2 to 5. The composite CO and PM₁₀ peak hourly traveling and idle emission factors and peak hourly vehicle uses are presented in Appendix B.

CO Concentrations

Tables 44 to 46 present the modeling results of the West Yellowstone Entrance for CO and for each Alternative. Table 44 shows the predicted maximum 1-hr average CO concentrations, and Table 45 shows the calculated maximum 8-hr average CO concentrations. The ratios of the maximum CO concentrations generated (i.e., without the background concentration) to the maximum CO concentration generated in the full implementation year of alternative 1a also are provided. The percent contributions of each vehicle type, including snowplows (heavy trucks), to the generation of CO are presented in Table 46.

Table 44. Maximum 1-hour average CO concentrations at the West Entrance.

Alternative	1-hr Maximum Concentration (w/o bkgd) (ppm)	1-hr Maximum Concentration (w/ bkgd) (ppm)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 1	29.20	32.2	19.47
Alt 1b Year 2	13.20	16.20	8.80
Alt 1b year 3 and beyond	1.50	4.50	1.00
Alt 2 year 1	11.73	14.73	7.82
Alt 2 year 2	8.75	11.75	5.84
Alt 2 year 3 and beyond	4.90	7.90	3.87
Alt 3 year 1	29.20	32.2	19.47
Alt 3 year 2 and beyond	2.80	5.80	1.87

Notes: A ratio equal to one (1) means equal concentrations. A ratio less than 1 means a decrease in concentration. A ratio greater than 1 means an increase in concentration relative to the full implementation of alternative 1b (i.e., year 3 and beyond).

Table 45. Maximum 8-hour average CO concentrations at the West Entrance.

Alternative	8-hr Maximum Concentration (w/o bkgd) (ppm)	8-hr Maximum Concentration (w/ bkgd) (ppm)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 1	20.44	22.54	19.47
Alt 1b year 2	9.24	11.34	8.80
Alt 1b year 3 and beyond	1.05	3.15	1.00
Alt 2 year 1	8.21	10.31	7.82
Alt 2 year 2	6.13	8.23	5.84
Alt 2 year 3 and beyond	3.43	5.53	3.27
Alt 3 year 1	20.44	22.54	19.47
Alt 3 year 2 and beyond	1.96	4.06	1.87

Notes: A ratio equal to one (1) means equal concentrations. A ratio less than 1 means a decrease in concentration. A ratio greater than 1 means an increase in concentration relative to the full implementation of alternative 1b (i.e., year 3 and beyond).

Table 46. Contributions to CO concentrations at the West Entrance.

Alternative	Contribution (percent)						
	Snowmobile	Snowcoach	Automobile	Light Truck	Heavy Truck	Tour Bus	Shuttle Van
Alt 1b year 1	98.1	1.8	0.0	0.0	0.1	0.0	0.0
Alt 1b year 2	96.3	3.5	0.0	0.0	0.2	0.0	0.0
Alt 1b beyond year 3	0.0	98.6	0.0	0.0	1.4	0.0	0.0
Alt 2 year 1	98.2	1.6	0.0	0.0	0.2	0.0	0.0
Alt 2 year 2	97.7	2.1	0.0	0.0	0.3	0.0	0.0
Alt 2 beyond year 3	95.2	4.13	0.0	0.0	0.5	0.0	0.0
Alt 3 year 1	98.1	1.8	0.0	0.0	0.1	0.0	0.0

Alternative	Contribution (percent)						
	Snowmobile	Snowcoach	Automobile	Light Truck	Heavy Truck	Tour Bus	Shuttle Van
Alt 3 beyond year 2	63.0	35.8	0.0	0.0	1.2	0.0	0.0

All the generated maximum 1-hr average and 8-hr average CO concentrations for the alternative 2 and 3 scenarios are higher than those of the full implementation scenario of alternative 1b (year 3 and beyond). The full implementation scenario of alternative 3 (year 2 and beyond) performs better than the full implementation scenario of alternative 2 (year 3 and beyond). For example, the ratio of the maximum 1-hr average and 8-hr average CO concentrations to the maximum 1-hr average and 8-hr average CO concentrations generated in the full implementation year of alternative 1b is 1.87 for alternative 3 and 3.87 for alternative 2. year 1 of alternatives 2 and 3 represent the existing conditions and show concentrations 19.47 times higher than those of the full implementation scenario of alternative 1b (year 3 and beyond). years 2 and 3 of alternative 2 are similar to year 1 in term of technologies, but the numbers of snowmobiles at the West Entrance are different. year 2 of alternative 1b represents 50% of snowmobile use at the West and South Entrances of YNP.

Only the predicted 1-hr average CO concentration (with the background concentration) of the existing conditions (year 1 of Alternatives 1b and 3) exceeds the Montana Ambient Air Quality Standards (AAQS) for CO, which is 23 ppm, and none exceeded the National AAQS, which is 35 ppm. The predicted 8-hr average CO concentrations (with the background concentration) of the existing conditions (year 1 of alternatives 2 and 3), year 2 of alternative 1b and year 1 of alternative 2 exceed the National and Montana NAAQS for CO, which is 9 ppm. Furthermore, the contributions of snowmobiles are highest in the snowmobile-containing scenarios.

PM₁₀ Concentrations

The predicted maximum 1-hr average concentrations of PM₁₀ and the calculated maximum 24-hr average concentrations of PM₁₀ are presented in Table 47 along with the ratios of maximum 24-hr average concentrations of PM₁₀ for all scenarios of alternatives 2 and 3 and that of the full implementation scenario of alternative 1b. The percent contributions of each vehicle type, including groomers (heavy trucks), to the generation of PM₁₀ are presented in Table 48.

Similar to the maximum CO concentration results, all the generated maximum 24-hr average PM₁₀ concentrations for the alternative 2 and 3 scenarios are higher than those of the full implementation scenario of alternative 1b (year 3 and beyond). The full implementation scenario of alternative 3 (year 2 and beyond) performs markedly better than the full implementation scenario of alternative 2 (year 3 and beyond). For example, the ratio of the maximum 24-hr average PM₁₀ concentrations to the maximum 24-hr average PM₁₀ concentrations generated in the full implementation year of alternative 1b is 4.0 for alternative 3 and 22.0 for alternative 2. The existing conditions show concentrations 144 times higher than those of the full implementation scenario of alternative 1b (year 3 and beyond). None of the predicted 24-hr average PM₁₀ concentrations (with the background concentration) exceeds the Montana or NAAQS for PM₁₀, which is 150 µg/m³. Furthermore, the contributions of snowmobiles are highest in the snowmobile-containing scenarios.

Table 47. Maximum PM₁₀ concentrations at the West Entrance.

Alternative	1-hr Maximum Concentration (w/o bkgd) (µg/m ³)	24-hr Maximum Concentration (w/o bkgd) (µg/m ³)	24-hr Maximum Concentration (w/ bkgd) (µg/m ³)	Ratio Relative to 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 1	144.00	57.60	80.60	144.00
Alt 1b year 2	56.00	22.40	45.40	56.00
Alt 1b year 3 and beyond	1.00	0.40	23.40	1.00
Alt 2 year 1	111.8	44.72	67.72	111.8
Alt 2 year 2	79.5	31.8	54.8	79.5
Alt 2 year 3 and beyond	44.8	17.92	40.92	44.8
Alt 3 year 1	144.00	57.60	80.60	144.00
Alt 3 year 2 and beyond	4.00	1.60	24.60	4.00

Notes: A ratio equal to one (1) means equal concentrations. A ratio less than 1 means a decrease in concentration. A ratio greater than 1 means an increase in concentration relative to the full implementation of alternative 1b (i.e., year 3 and beyond).

Table 48. Contributions to PM₁₀ Concentrations at the West Entrance.

Alternative	Contribution (percent)						
	Snowmobile	Snowcoach	Automobile	Light Truck	Heavy Truck	Tour Bus	Shuttle Van
Alt 1b year 1	99.3	0.2	0.0	0.0	0.5	0.0	0.0
Alt 1b year 2	98.7	0.4	0.0	0.0	0.9	0.0	0.0
Alt 1b beyond year 3	0.0	29.1	0.0	0.0	70.9	0.0	0.0
Alt 2 year 1	99.3	0.02	0.0	0.0	0.67	0.0	0.0
Alt 2 year 2	99.1	0.03	0.0	0.0	0.86	0.0	0.0
Alt 2 beyond year 3	98.3	0.07	0.0	0.0	1.59	0.0	0.0
Alt 3 year 1	99.3	0.2	0.0	0.0	0.5	0.0	0.0
Alt 3 beyond year 2	76.3	3.1	0.0	0.0	20.6	0.0	0.0

Roadway Segments

Similar to the West Yellowstone Entrance analysis, the road segments selected were modeled using CAL3QHC. When executed without a queue link, CAL3QHC behaves exactly like CALINE3, the recommended model for road segments. Receptors were located on both sides of the road segment links outside the mixing zone. The composite CO and PM₁₀ peak hourly traveling emission factors were calculated based on the emission factors presented in Table 2 to 5 and they are presented in Appendix B of the air quality analysis report (EA 2001). The peak hourly vehicle uses also are presented in Appendix B.

West Yellowstone Entrance to Madison Junction Roadway Segment

The West Yellowstone Entrance to Madison Junction road segment is approximately 22 km long. The segment selected for modeling is a 16-km stretch of road starting approximately 8 km from the West Yellowstone Entrance. It was subdivided into 4 short links because of directional changes in the roadway.

CO Concentrations. Tables 49 to 52 present the modeling results of the West Yellowstone Entrance to Madison Junction road segment for CO and for each alternative. Table 48 shows the predicted maximum 1-hr average CO concentrations, and Table 12 shows the calculated maximum 8-hr average CO concentrations. The ratios of the maximum CO

concentrations generated (i.e., without the background concentration) to the maximum CO concentration generated in the full implementation year of alternative 1a also are provided. The percent contributions of each vehicle type, including groomers (heavy trucks), to the generation of CO are presented in Table 50.

Table 48. Maximum 1-hour Average CO concentrations at the West Entrance-Madison Junction roadway segment.

Alternative	1-hr Maximum Concentration (w/o bkgd) (ppm)	1-hr Maximum Concentration (w/ bkgd) (ppm)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 1	11.70	12.35	23.40
Alt 1b year 2	5.90	6.55	11.80
Alt 1b year 3 and beyond	0.50	1.15	1.00
Alt 2 year 1	3.61	4.26	7.22
Alt 2 year 2	2.84	3.49	5.68
Alt 2 year 3 and beyond	1.74	2.39	3.48
Alt 3 year 1	11.70	12.35	23.40
Alt 3 year 2 and beyond	0.80	1.45	1.60

Notes: A ratio equal to one (1) means equal concentrations. A ratio less than 1 means a decrease in concentration. A ratio greater than 1 means an increase in concentration relative to the full implementation of alternative 1b (i.e., year 3 and beyond).

Table 49. Maximum 8-Hour average CO concentrations at the West Entrance-Madison Junction roadway segment.

Alternative	8-hr Maximum Concentration (w/o bkgd) (ppm)	8-hr Maximum Concentration (w/ bkgd) (ppm)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 1	8.19	8.65	23.40
Alt 1b year 2	4.13	4.59	11.80
Alt 1b year 3 and beyond	0.35	0.81	1.00
Alt 2 year 1	2.53	2.98	7.22
Alt 2 year 2	1.99	2.44	5.68
Alt 2 year 3 and beyond	1.22	1.67	3.48
Alt 3 year 1	8.19	8.65	23.40
Alt 3 year 2 and beyond	0.56	1.02	1.60

Notes: A ratio equal to one (1) means equal concentrations. A ratio less than 1 means a decrease in concentration. A ratio greater than 1 means an increase in concentration relative to the full implementation of alternative 1b (i.e., year 3 and beyond).

Table 50. Contributions to CO concentrations at the West Entrance-Madison Junction roadway segment.

Alternative	Contribution (percent)						
	Snowmobile	Snowcoach	Automobile	Light Truck	Heavy Truck	Tour Bus	Shuttle Van
Alt 1b year 1	98.7	1.3	0.0	0.0	0.0	0.0	0.0
Alt 1b year 2	97.4	2.5	0.0	0.0	0.1	0.0	0.0
Alt 1b beyond year 3	0.0	99.1	0.0	0.0	0.9	0.0	0.0
Alt 2 year 1	98.5	1.4	0.0	0.0	0.1	0.0	0.0
Alt 2 year 2	98.0	1.8	0.0	0.0	0.2	0.0	0.0
Alt 2 beyond year 3	96.0	3.7	0.0	0.0	0.3	0.0	0.0
Alt 3 year 1	98.7	1.3	0.0	0.0	0.0	0.0	0.0
Alt 3 beyond year 2	77.4	22.1	0.0	0.0	0.5	0.0	0.0

The results of West Entrance to Madison Junction roadway segment show the same trends as those of the West Yellowstone Entrance for CO, except that no standards are exceeded. All the generated maximum 1-hr average and 8-hr average CO concentrations for the alternative 2 and 3 scenarios are higher than those of the full implementation scenario of alternative 1b (year 3 and beyond). The full implementation scenario of alternative 3 (year 2 and beyond) performs better than the full implementation scenario of alternative 2 (year 3 and beyond). For example, the ratio of the maximum 1-hr average and 8-hr average CO concentrations to the maximum 1-hr average and 8-hr average CO concentrations generated in the full implementation year of alternative 1b is 1.60 for alternative 3 and 3.48 for alternative 2. Year 1 of alternatives 1b and 3 represent the existing conditions that show concentrations 23.40 times higher than those of the full implementation scenario of alternative 1b (year 3 and beyond). However, none of the predicted 1-hr average and 8-hr average CO concentrations (with the background concentration) exceeds the 1-hr average and 8-hr average CO concentrations of the Wyoming and National AAQS, respectively. Furthermore, the contributions of snowmobiles are highest in the snowmobile-containing scenarios.

PM₁₀ Concentrations. The predicted maximum 1-hr average concentrations of PM₁₀ and the calculated maximum 24-hr average concentrations of PM₁₀ are presented in Table 51 along with the ratios of maximum 24-hr average concentrations of PM₁₀ for all scenarios of alternatives 2 and 3 and that of the full implementation scenario of alternative 1b. The percent contributions of each vehicle type, including snowplows (heavy trucks), to the generation of PM₁₀ are presented in Table 52.

Table 51. Maximum PM₁₀ concentrations at the West Entrance-Madison Junction roadway segment.

Alternative	1-hr Maximum Concentration (w/o bkgd) (µg/m ³)	24-hr Maximum Concentration (w/o bkgd) (µg/m ³)	24-hr Maximum Concentration (w/ bkgd) (µg/m ³)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd))
Alt 1b year 1	34.00	13.60	18.60	34.00
Alt 1b year 2	17.00	6.80	11.80	17.00
Alt 1b year 3 and beyond	1.00	0.40	5.40	1.00
Alt 2 year 1	34.7	13.88	18.88	34.7
Alt 2 year 2	28.1	11.24	16.24	28.1
Alt 2 year 3 and beyond	17.4	6.96	11.96	17.4
Alt 3 year 1	34.00	13.60	18.60	34.00
Alt 3 year 2 and beyond	1.00	0.40	5.40	1.00

Notes: A ratio equal to one (1) means equal concentrations. A ratio less than 1 means a decrease in concentration. A ratio greater than 1 means an increase in concentration relative to the full implementation of alternative 1b (i.e., year 3 and beyond).

Table 52. Contributions to PM₁₀ concentrations at the West Entrance-Madison Junction roadway segment.

Alternative	Contribution (percent)						
	Snowmobile	Snowcoach	Automobile	Light Truck	Heavy Truck	Tour Bus	Shuttle Van
Alt 1b year 1	97.7	1.0	0.0	0.0	1.3	0.0	0.0
Alt 1b year 2	95.6	1.9	0.0	0.0	2.5	0.0	0.0
Alt 1b beyond year 3	0.0	50.5	0.0	0.0	49.5	0.0	0.0
Alt 2 year 1	98.66	0.13	0.0	0.0	1.21	0.0	0.0
Alt 2 year 2	98.28	0.16	0.0	0.0	1.56	0.0	0.0
Alt 2	96.76	0.34	0.0	0.0	2.80	0.0	0.0

Alternative	Contribution (percent)						
	Snowmobile	Snowcoach	Automobile	Light Truck	Heavy Truck	Tour Bus	Shuttle Van
beyond year 3							
Alt 3 year 1	97.7	1.0	0.0	0.0	1.3	0.0	0.0
Alt 3 beyond year 2	58.5	11.5	0.0	0.0	30.0	0.0	0.0

All the generated maximum 24-hr average PM₁₀ concentrations for the alternative 2 and 3 scenarios are higher than those of the full implementation scenario of alternatives 1b (year 3 and beyond). The full implementation scenario of alternative 3 (year 2 and beyond) performs better than the full implementation scenario of alternative 2 (year 3 and beyond). For example, the ratio of the maximum 24-hr average PM₁₀ concentrations to the maximum 24-hr average PM₁₀ concentrations generated in the full implementation year of alternative 1b is 1.0 for alternative 3 and 17.4 for alternative 2. The existing conditions show concentrations 34 times higher than those of the full implementation scenario of alternative 1b (year 3 and beyond). None of the predicted 24-hr average PM₁₀ concentrations (with the background concentration) exceeds the state or National AAQS for 24-hr average concentration of PM₁₀, which is 150 µg/m³.

Flagg Ranch to Colter Bay Roadway Segment

The Flagg Ranch staging area to Colter Bay village road segment is approximately 21 km long. The segment selected for modeling is a 10-km stretch of the road starting approximately 11 km from Flagg Ranch. This road segment is characterized by an elevated groomed motorized trail for snowmobiles adjacent to a plowed highway. It was therefore subdivided into eight short links (four for the main road and four for the adjacent trail).

CO Concentrations. Tables 53 to 55 present the modeling results of the Flagg Ranch staging area to Colter Bay village road segment for CO and for each alternative. Table 16 shows the predicted maximum 1-hr average CO concentrations, and Table 54 shows the calculated maximum 8-hr average CO concentrations. The ratios of the maximum CO concentrations generated (i.e., without the background concentration) to the maximum CO concentration generated in the full implementation year of alternative 1b also are provided. The percent contributions of each vehicle type, including snowplows (heavy trucks), to the generation of CO are presented in Table 55.

The generated maximum 1-hr average and 8-hr average concentrations of CO for the full implementation scenarios of alternative 1b and 3 are equal. Those of the full implementation scenario of alternative 2 are 2.90 times higher. The generated maximum 1-hr average and 8-hr average CO concentrations are equal for both years 1 and 2 of alternative 1b and year 1 of alternative 3, representing 5.5 times the maximum concentrations of the full implementation scenario of alternative 1b. Both years 1 and 2 of alternative 2 generated the same maximum concentration, which is 3 times the maximum concentrations of the full implementation scenario of alternative 1b. None of the predicted 1-hr average and 8-hr average CO concentrations (with the background concentration) exceeds the 1hr average and 8-hr average CO concentrations exceed the state and NAAQS of 35 ppm and 9 ppm, respectively. Here, wheeled vehicles contribute the most in the generation of CO, when they are included in a given scenario.

Table 53. Maximum 1-hour average CO concentrations at the Flagg Ranch to Colter Bay roadway segment.

Alternative	1-hr Maximum Concentration (w/o bkgd) (ppm)	1-hr Maximum Concentration (w/ bkgd) (ppm)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 1	1.10	1.75	5.5
Alt 1b year 2	1.10	1.75	5.5
Alt 1b year 3 and beyond	0.20	0.85	1.00
Alt 2 year 1	0.60	1.25	3.00
Alt 2 year 2	0.60	1.25	3.00
Alt 2 year 3 and beyond	0.58	1.23	2.90
Alt 3 year 1	1.10	1.75	5.5
Alt 3 year 2 and beyond	0.20	0.85	1.00

Notes: A ratio equal to one (1) means equal concentrations. A ratio less than 1 means a decrease in concentration. A ratio greater than 1 means an increase in concentration relative to the full implementation of alternative 1b (i.e., year 3 and beyond).

Table 54. Maximum 8-hour average CO concentrations at the Flagg Ranch to Colter Bay Junction roadway segment.

Alternative	8-hr Maximum Concentration (w/o bkgd) (ppm)	8-hr Maximum Concentration (w/ bkgd) (ppm)	Ratio Relative to Alt 1b Year 2 and Beyond (w/o bkgd)
Alt 1b year 1	0.77	1.23	5.50
Alt 1b year 2	0.77	1.23	5.50
Alt 1b year 3 and beyond	0.14	0.60	1.00
Alt 2 year 1	0.42	0.88	3.00
Alt 2 year 2	0.42	0.88	3.00
Alt 2 year 3 and beyond	0.41	0.86	2.90
Alt 3 year 1	0.77	1.23	5.50
Alt 3 year 2 and beyond	0.14	0.60	1.00

Notes: A ratio equal to one (1) means equal concentrations. A ratio less than 1 means a decrease in concentration. A ratio greater than 1 means an increase in concentration relative to the full implementation of alternative 1b (i.e., year 3 and beyond).

Table 55. Contributions to CO concentrations at Flagg Ranch to Colter Bay roadway segment.

Alternative	Contribution (percent)						
	Snowmobile	Snowcoach	Automobile	Light Truck	Heavy Truck	Tour Bus	Shuttle Van
Alt 1b year 1	20.5	0.0	21.5	51.7	0.9	0.7	4.8
Alt 1b year 2	20.5	0.0	21.5	51.7	0.9	0.7	4.8
Alt 1b beyond year 3	0.0	97.3	0.0	0.0	2.7	0.0	0.0
Alt 2 year 1	98.4	0.0	0.0	0.0	1.6	0.0	0.0
Alt 2 year 2	98.4	0.0	0.0	0.0	1.6	0.0	0.0
Alt 2 beyond year 3	99.6	0.0	0.0	0.0	0.4	0.0	0.0
Alt 3 year 1	20.5	0.0	21.5	51.7	0.9	0.7	4.8
Alt 3 beyond year 2	99.2	0.0	0.0	0.0	0.8	0.0	0.0

PM₁₀ Concentrations. The predicted maximum 1-hr average concentrations of PM₁₀ and the calculated maximum 24-hr average concentrations of PM₁₀ are presented in Table 56 along

with the ratios of maximum 24-hr average concentrations of PM₁₀ for all the scenarios of alternatives 1b and 2 and that the full implementation scenario of alternative 1b. The percent contributions of each vehicle type, including snowplows (heavy trucks), to the generation of PM₁₀ are presented in Table 57.

Table 56. Maximum PM₁₀ concentrations at the Flagg Ranch to Colter Bay roadway segment.

Alternative	1-hr Maximum Concentration (w/o bkgd) (µg/m ³)	24-hr Maximum Concentration (w/o bkgd) (µg/m ³)	24-hr Maximum Concentration (w/ bkgd) (µg/m ³)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 1	3.00	1.20	6.20	3.00
Alt 1b year 2	3.00	1.20	6.20	3.00
Alt 1b year 3 and beyond	1.00	0.40	5.40	1.00
Alt 2 year 1	2.00	0.80	5.80	2.00
Alt 2 year 2	2.00	0.80	5.80	2.00
Alt 2 year 3 and beyond	5.80	2.32	7.32	5.80
Alt 3 year 1	3.00	1.20	6.20	3.00
Alt 3 year 2 and beyond	<0.01	<0.01	5.00	<0.00

Notes: A ratio equal to one (1) means equal concentrations. A ratio less than 1 means a decrease in concentration.

A ratio greater than 1 means an increase in concentration relative to the full implementation of alternative 1b (i.e., year 3 and beyond).

Table 57. Contributions to PM₁₀ concentrations at the Flagg Ranch to Colter Bay roadway segment.

Alternative	Contribution (percent)						
	Snowmobile	Snowcoach	Automobile	Light Truck	Heavy Truck	Tour Bus	Shuttle Van
Alt 1b year 1	18.7	0.0	10.5	20.9	27.8	20.2	1.9
Alt 1b year 2	18.7	0.0	10.5	20.9	27.8	20.2	1.9
Alt 1b beyond year 3	0.0	25.2	0.0	0.0	74.8	0.0	0.0
Alt 2 year 1	86.1	0.0	0.0	0.0	13.9	0.0	0.0
Alt 2 year 2	86.1	0.0	0.0	0.0	13.9	0.0	0.0
Alt 2 beyond year 3	96.6	0.0	0.0	0.0	3.43	0.0	0.0

Alternative	Contribution (percent)						
	Snowmobile	Snowcoach	Automobile	Light Truck	Heavy Truck	Tour Bus	Shuttle Van
Alt 3 year 1	18.7	0.0	10.5	20.9	27.8	20.2	1.9
Alt 3 beyond year 2	62.4	0.0	0.0	0.0	37.6	0.0	0.0

The full implementation scenario of alternative 3 performs better than the alternative 1b scenario while that for alternative 2 performs worse. The ratios of the generated 24-hr average maximum PM₁₀ concentrations to that of alternative 1b (year 3 and beyond) are 5.80 and <0.01 for alternatives 2 and 3, respectively. None of the predicted 24-hr average PM₁₀ concentrations (with the background concentration) exceeds the state or National AAQs for the 24-hr average concentration of PM₁₀, which is 150 µg/m³.

Mammoth to Northeast Entrance Roadway Segment

The Mammoth Hot Springs to Tower Roosevelt road segment is approximately 29 km long. The segment selected for modeling is a 6-km stretch of the road starting approximately 10 km from Mammoth Hot Springs. This road segment is characterized by wheeled vehicle use only. It was also subdivided into four short links. It was assumed that the vehicle use does not change yearly nor by alternative and that the emission factors do not change.

CO Concentrations. Tables 58 to 60 present the modeling results of the Mammoth Hot Springs to Tower Roosevelt road segment for CO and for each alternative. Table 58 shows the predicted maximum 1-hr average CO concentrations, and Table 59 shows the calculated maximum 8-hr average CO concentrations. The ratios of the maximum CO concentrations generated (i.e., without the background concentration) to the maximum CO concentration generated in the full implementation year of alternative 1b also are provided. The percent contributions of each vehicle type, including snowplows (heavy trucks), to the generation of CO are presented in Table 60.

Table 58. Maximum 1-hour average CO concentrations at the Mammoth to Northeast Entrance roadway segment.

Alternative	1-hr Maximum Concentration (w/o bkgd) (ppm)	1-hr Maximum Concentration (w/ bkgd) (ppm)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 1	0.30	0.95	1.00
Alt 1b year 2	0.30	0.95	1.00

Alternative	1-hr Maximum Concentration (w/o bkgd) (ppm)	1-hr Maximum Concentration (w/ bkgd) (ppm)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 3 and beyond	0.30	0.95	1.00
Alt 2 year 1	0.30	0.95	1.00
Alt 2 year 2	0.30	0.95	1.00
Alt 2 year 3 and beyond	0.30	0.95	1.00
Alt 3 year 1	0.30	0.95	1.00
Alt 3 year 2 and beyond	0.30	0.95	1.00

Notes: A ratio equal to one (1) means equal concentrations. A ratio less than 1 means a decrease in concentration. A ratio greater than 1 means an increase in concentration relative to the full implementation of alternative 1b (i.e., year 3 and beyond).

Table 59. Maximum 8-hour average CO concentrations at the Mammoth to Northeast Entrance roadway segment.

Alternative	8-hr Maximum Concentration (w/o bkgd) (ppm)	8-hr Maximum Concentration (w/ bkgd) (ppm)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 1	0.21	0.67	1.00
Alt 1b year 2	0.21	0.67	1.00
Alt 1b year 3 and beyond	0.21	0.67	1.00
Alt 2 year 1	0.21	0.67	1.00
Alt 2 year 2	0.21	0.67	1.00
Alt 2 year 3 and beyond	0.21	0.67	1.00
Alt 3 year 1	0.21	0.67	1.00
Alt 3 year 2 and beyond	0.21	0.67	1.00

Notes: A ratio equal to one (1) means equal concentrations. A ratio less than 1 means a decrease in concentration. A ratio greater than 1 means an increase in concentration relative to the full implementation of alternative 1b (i.e., year 3 and beyond).

Because it was assumed that the vehicle use does not change yearly nor by alternative and that the emission factors do not change either, the maximum CO concentrations are the same for each alternative. The generated maximum 1-hr average and 8-hr average CO concentrations are equal to 0.30 ppm and 0.21 ppm respectively. The highest contribution to CO generation is from light trucks.

Table 60. Contributions to CO concentrations at Mammoth to Northeast Entrance roadway segment.

Alternative	Contribution (percent)						
	Snowmobile	Snowcoach	Automobile	Light Truck	Heavy Truck	Tour Bus	Shuttle Van
Alt 1b year 1	0.0	0.0	27.9	66.2	1.5	0.6	3.8
Alt 1b year 2	0.0	0.0	27.9	66.2	1.5	0.6	3.8
Alt 1b beyond year 3	0.0	0.0	27.9	66.2	1.5	0.6	3.8
Alt 2 year 1	0.0	0.0	27.9	66.2	1.5	0.6	3.8
Alt 2 year 2	0.0	0.0	27.9	66.2	1.5	0.6	3.8
Alt 2 beyond year 3	0.0	0.0	27.9	66.2	1.5	0.6	3.8
Alt 3 year 1	0.0	0.0	27.9	66.2	1.5	0.6	3.8
Alt 3 beyond year 2	0.0	0.0	27.9	66.2	1.5	0.6	3.8

PM₁₀ Concentrations. The predicted maximum 1-hr average concentrations of PM₁₀ and the calculated maximum 24-hr average concentrations of PM₁₀ are presented in Table 24 along with the ratios of maximum 24-hr average concentrations of PM₁₀ for all scenarios of alternatives 2 and 3 and that the full implementation scenario of alternative 1b. The percent contributions of each vehicle type, including snowplows (heavy trucks), to the generation of PM₁₀ are presented in Table 62.

Table 61. Maximum PM₁₀ concentrations at the Mammoth to Northeast Entrance roadway segment.

Alternative	1-hr Maximum Concentration (w/o bkgd) (µg/m ³)	24-hr Maximum Concentration (w/o bkgd) (µg/m ³)	24-hr Maximum Concentration (w/ bkgd) (µg/m ³)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 1	1.00	0.40	5.40	1.00
Alt 1b year 2	1.00	0.40	5.40	1.00
Alt 1b year 3 and beyond	1.00	0.40	5.40	1.00
Alt 2 year 1	1.00	0.40	5.40	1.00
Alt 2 year 2	1.00	0.40	5.40	1.00

Alternative	1-hr Maximum Concentration (w/o bkgd) ($\mu\text{g}/\text{m}^3$)	24-hr Maximum Concentration (w/o bkgd) ($\mu\text{g}/\text{m}^3$)	24-hr Maximum Concentration (w/ bkgd) ($\mu\text{g}/\text{m}^3$)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 2 year 3 and beyond	1.00	0.40	5.40	1.00
Alt 3 year 1	1.00	0.40	5.40	1.00
Alt 3 year 2 and beyond	1.00	0.40	5.40	1.00

A ratio equal to one (1) means equal concentrations. A ratio less than 1 means a decrease in concentration.

A ratio greater than 1 means an increase in concentration relative to the full implementation of alternative 1b.

Table 62. Contributions to PM_{10} concentrations at the Mammoth to Northeast Entrance roadway segment.

Alternative	Contribution (percent)						
	Snowmobile	Snowcoach	Automobile	Light Truck	Heavy Truck	Tour Bus	Shuttle Van
Alt 1b year 1	0.0	0.0	12.9	25.2	44.9	15.5	1.5
Alt 1b year 2	0.0	0.0	12.9	25.2	44.9	15.5	1.5
Alt 1b beyond year 3	0.0	0.0	12.9	25.2	44.9	15.5	1.5
Alt 2 year 1	0.0	0.0	12.9	25.2	44.9	15.5	1.5
Alt 2 year 2	0.0	0.0	12.9	25.2	44.9	15.5	1.5
Alt 2 beyond year 3	0.0	0.0	12.9	25.2	44.9	15.5	1.5
Alt 3 year 1	0.0	0.0	12.9	25.2	44.9	15.5	1.5
Alt 3 beyond year 2	0.0	0.0	12.9	25.2	44.9	15.5	1.5

Because it was assumed that the vehicle use does not change yearly nor by alternative and that the emission factors do not change either, the maximum PM_{10} concentrations are the same for each alternative. The generated maximum 24-hr average PM_{10} concentration is equal to $0.40 \mu\text{g}/\text{m}^3$. The highest contribution to PM_{10} generation is from heavy trucks.

Staging Areas

The Old Faithful and Flagg Ranch staging areas also were modeled in this study. Old Faithful contains three main parking areas designed primarily for visitors, while Flagg Ranch contains two main parking areas designed for visitors, guides, and outfitters. Traffic in both

staging areas is in idling or slow-moving mode for long periods of time. Therefore, they were modeled as area sources using the EPA ISCST3 model. ISCST3 is a refined dispersion model based on the steady-state Gaussian plume equation designed to estimate concentration or deposition levels for each source-receptor combination. It requires source characteristics, source strength, hourly meteorological data, receptor locations, and terrain data as critical input data. In each of the two staging areas, a single area encompassing the major parking lots were drawn and used as modeling areas. The composite CO and PM₁₀ peak hourly idle emission factors were calculated based on the emission factors presented in Tables 38 to 39. A gridded receptor system was located around the areas using a 100-meter spacing up to a distance of 1,000 m.

Old Faithful

CO Concentrations. Tables 63 to 65 present the modeling results of the Old Faithful staging area for CO and for each alternative. Table 63 shows the predicted maximum 1-hr average CO concentrations, and Table 64 shows the calculated maximum 8-hr average CO concentrations. The ratios of the maximum CO concentrations generated (i.e., without the background concentration) to the maximum CO concentration generated in the full implementation year of alternative 1b are also provided. The percent contributions of each vehicle type, including groomers (heavy trucks), to the generation of CO are presented in Table 55.

Table 63. Maximum 1-hour average CO concentrations at Old Faithful.

Alternative	1-hr Maximum Concentration (w/o bkgd) (ppm)	1-hr Maximum Concentration (w/ bkgd) (ppm)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 1	1.29	1.94	1.16
Alt 1b year 2	1.27	1.92	1.14
Alt 1b year 3 and beyond	1.11	1.76	1.00
Alt 2 year 1	0.84	1.49	0.76
Alt 2 year 2	0.83	1.49	0.75
Alt 2 year 3 and beyond	0.66	1.31	0.59
Alt 3 year 1	1.29	1.94	1.16
Alt 3 year 2 and beyond	0.13	0.78	0.12

Notes: A ratio equal to one (1) means equal concentrations. A ratio less than 1 means a decrease in concentration. A ratio greater than 1 means an increase in concentration relative to the full implementation of alternative 1b (i.e., year 3 and beyond).

Table 64. Maximum 8-hour average CO concentrations at Old Faithful.

Alternative	8-hr Maximum Concentration (w/o bkgd) (ppm)	8-hr Maximum Concentration (w/ bkgd) (ppm)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 1	0.22	0.67	1.22
Alt 1b year 2	0.21	0.67	1.14
Alt 1b year 3 and beyond	0.18	0.64	1.00
Alt 2 year 1	0.14	0.60	0.76
Alt 2 year 2	0.14	0.60	0.75
Alt 2 year 3 and beyond	0.11	0.57	0.59
Alt 3 year 1	0.22	0.67	1.22
Alt 3 year 2 and beyond	0.02	0.48	0.12

Notes: A ratio equal to one (1) means equal concentrations. A ratio less than 1 means a decrease in concentration. A ratio greater than 1 means an increase in concentration relative to the full implementation of alternative 1b (i.e., year 3 and beyond).

Table 65. Contributions to CO concentrations at Old Faithful.

Alternative	Contribution (percent)						
	Snowmobile	Snowcoach	Automobile	Light Truck	Heavy Truck	Tour Bus	Shuttle Van
Alt 1b year 1	97.4	1.9	0.0	0.0	0.7	0.0	0.0
Alt 1b year 2	95.8	3.1	0.0	0.0	1.1	0.0	0.0
Alt 1b beyond year 3	0.0	96.7	0.0	0.0	3.3	0.0	0.0
Alt 2 year 1	95.2	3.6	0.0	0.0	1.2	0.0	0.0
Alt 2 year 2	94.2	4.4	0.0	0.0	1.5	0.0	0.0
Alt 2 beyond year 3	94.0	4.5	0.0	0.0	1.5	0.0	0.0
Alt 3 year 1	97.4	1.9	0.0	0.0	0.7	0.0	0.0
Alt 3 beyond year 2	53.1	41.5	0.0	0.0	5.4	0.0	0.0

All the scenarios of alternative 2 and year 3 of alternative 3 perform better than the full implementation scenario of alternative 1b. The ratio of the generated 1-hr average and 8-hr average maximum CO concentrations to those of the full implementation of alternative 1b varies from 0.59 to 0.76 for alternative 2 and is equal to 0.12 for alternative 3. year 1 of alternatives 1b and 3 represent the existing conditions that show concentrations 1.22 times higher than those of the full implementation scenario of alternative 1b (year 3 and beyond).

None of the predicted 1-hr average and 8-hr average CO concentrations (with the background concentration) exceeds the 1-hr average and 8-hr average CO concentration the Wyoming and National AAQS of 35 ppm and 9 ppm, respectively.

PM₁₀ Concentrations. The predicted maximum 24-hr average concentrations of PM₁₀ are presented in Table 66 along with the ratios of maximum 24-hr average concentrations of PM₁₀ for all scenarios of alternatives 2 and 3 and the full implementation scenario of alternative 1b. The percent contributions of each vehicle type, including groomers (heavy trucks), to the generation of PM₁₀ are presented in Table 67.

Table 66. Maximum PM₁₀ concentrations at Old Faithful.

Alternative	24-hr Maximum Concentration (w/o bkgd) (µg/m ³)	24-hr Maximum Concentration (w/ bkgd) (µg/m ³)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 1	0.63	5.63	10.50
Alt 1b year 2	0.62	5.62	10.33
Alt 1b year 3 and beyond	0.06	5.06	1.00
Alt 2 year 1	0.41	5.41	6.83
Alt 2 year 2	0.41	5.41	6.83
Alt 2 year 3 and beyond	0.32	5.32	5.33
Alt 3 year 1	0.63	5.63	10.5
Alt 3 year 2 and beyond	0.03	5.03	0.50

Notes: A ratio equal to one (1) means equal concentrations. A ratio less than 1 means a decrease in concentration. A ratio greater than 1 means an increase in concentration relative to the full implementation of alternative 1b (i.e., year 3 and beyond).

Table 67. Contributions to PM₁₀ concentrations at Old Faithful.

Alternative	Contribution (percent)						
	Snowmobile	Snowcoach	Automobile	Light Truck	Heavy Truck	Tour Bus	Shuttle Van
Alt 1b year 1	97.8	0.0	0.0	0.0	2.2	0.0	0.0
Alt 1b year 2	96.3	0.0	0.0	0.0	3.6	0.0	0.0
Alt 1b beyond year 3	0.0	0.2	0.0	0.0	99.8	0.0	0.0
Alt 2 year 1	95.9	0.0	0.0	0.0	4.1	0.0	0.0
Alt 2 year 2	94.9	0.0	0.0	0.0	5.1	0.0	0.0
Alt 2	94.8	0.0	0.0	0.0	5.2	0.0	0.0

Alternative	Contribution (percent)						
	Snowmobile	Snowcoach	Automobile	Light Truck	Heavy Truck	Tour Bus	Shuttle Van
beyond year 3							
Alt 3 year 1	97.8	0.0	0.0	0.0	2.2	0.0	0.0
Alt 3 beyond year 2	52.9	0.0	0.0	0.0	47.1	0.0	0.0

Similar to CO, all the scenarios of alternative 2 and year 3 of alternative 3 perform better than the full implementation scenario of alternative 1b. The ratio of the generated 24-hr average PM₁₀ concentrations to those of the full implementation of alternative 1b varies from 5.33 to 6.83 for alternative 2 and is equal to 0.50 for alternative 3. year 1 of alternatives 2 and 3 represent the existing conditions that show concentrations 10.50 times higher than those of the full implementation scenario of alternative 1b (year 3 and beyond). Moreover, none of the predicted 24-hr average PM₁₀ concentrations (with the background concentration) exceeds the NAAQS for the 24-hr average concentration of PM₁₀, which is 150 µg/m³. Furthermore, the contributions of snowmobiles are highest in the snowmobile-containing alternatives

Flagg Ranch

CO Concentrations. Tables 68-70 present the modeling results of the Flagg Ranch staging area for CO and for each alternative. Table 31 shows the predicted maximum 1-hr average CO concentrations, and Table 69 shows the calculated maximum 8-hr average CO concentrations. The ratios of the maximum CO concentrations generated (i.e., without the background concentration) to the maximum CO concentration generated in the full implementation year of alternative 1b also are provided. The percent contributions of each vehicle type, including snowplows (heavy trucks), to the generation of CO are presented in Table 70.

Table 68. Maximum 1-hour average CO concentrations at Flagg Ranch.

Alternative	1-hr Maximum Concentration (w/o bkgd) (ppm)	1-hr Maximum Concentration (w/ bkgd) (ppm)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 1	1.66	2.31	1.23
Alt 1b year 2	1.66	2.31	1.23

CHAPTER IV
ENVIRONMENTAL CONSEQUENCES

Alternative	1-hr Maximum Concentration (w/o bkgd) (ppm)	1-hr Maximum Concentration (w/ bkgd) (ppm)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 3 and beyond	1.35	2.00	1.00
Alt 2 year 1	1.04	1.70	0.77
Alt 2 year 2	1.04	1.70	0.77
Alt 2 year 3 and beyond	0.9	1.55	0.67
Alt 3 year 1	1.66	2.31	1.23
Alt 3 year 2 and beyond	0.12	0.77	0.09

Notes: A ratio equal to one (1) means equal concentrations. A ratio less than 1 means a decrease in concentration. A ratio greater than 1 means an increase in concentration relative to the full implementation of alt. 1b

Table 69. Maximum 8-hour average CO concentrations at Flagg Ranch.

Alternative	8-hr Maximum Concentration (w/o bkgd) (ppm)	8-hr Maximum Concentration (w/ bkgd) (ppm)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 1	0.28	0.73	1.27
Alt 1b year 2	0.28	0.73	1.27
Alt 1b year 3 and beyond	0.22	0.68	1.00
Alt 2 year 1	0.17	0.63	0.77
Alt 2 year 2	0.17	0.63	0.77
Alt 2 year 3 and beyond	0.15	0.61	0.67
Alt 3 year 1	0.28	0.73	1.27
Alt 3 year 2 and beyond	0.02	0.48	0.09

Table 70. Contributions to CO concentrations at Flagg Ranch.

Alternative	Contribution (percent)						
	Snowmobile	Snowcoach	Automobile	Light Truck	Heavy Truck	Tour Bus	Shuttle Van
Alt 1b year 1	71.9	1.3	7.9	15.6	1.5	0.3	1.4
Alt 1b year 2	71.9	1.3	7.9	15.6	1.5	0.3	1.4
Alt 1b beyond year 3	0.0	92.6	0.0	0.0	7.4	0.0	0.0

Alternative	Contribution (percent)						
	Snowmobile	Snowcoach	Automobile	Light Truck	Heavy Truck	Tour Bus	Shuttle Van
Alt 2 year 1	89.6	4.9	0.0	0.0	5.6	0.0	0.0
Alt 2 year 2	89.6	4.9	0.0	0.0	5.6	0.0	0.0
Alt 2 beyond year 3	95.5	2.1	0.0	0.0	2.4	0.0	0.0
Alt 3 year 1	71.9	1.3	7.9	15.6	1.5	0.3	1.4
Alt 3 beyond year 2	82.5	8.1	0.0	0.0	9.3	0.0	0.0

The Flagg Ranch staging area shows the same trend as the Old Faithful staging area. All the scenarios of alternative 2 and year 3 of alternative 3 perform better than the full implementation scenario of Alternative 1b. The ratio of the generated 1-hr average and 8-hr average maximum CO concentrations to those of the full implementation of alternative 1b varies from 0.67 to 0.77 for alternative 2 and is equal to 0.09 for alternative 2. Year 1 of alternatives 1b and 3 represent the existing conditions that show concentrations 1.27 times higher than those of the full implementation scenario of alternative 1b (year 3 and beyond). None of the predicted 1-hr average and 8-hr average CO concentrations (with the background concentration) exceeds the 1-hr average and 8-hr average CO concentration Wyoming and National AAQs of 35 ppm and 9 ppm, respectively.

PM₁₀ Concentrations. The predicted maximum 24-hr average concentrations of PM₁₀ are presented in Table 71 along with the ratios of maximum 24-hr average concentrations of PM₁₀ for all scenarios of alternatives 2 and 3 and that the full implementation scenario of alternative 1b. The percent contributions of each vehicle type, including snowplows (heavy trucks), to the generation of PM₁₀ are presented in Table 72.

Table 71. Maximum PM₁₀ concentrations at Flagg Ranch.

Alternative	24-hr Maximum Concentration (w/o bkgd) (µg/m ³)	24-hr Maximum Concentration (w/ bkgd) (µg/m ³)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 1b year 1	0.63	5.63	3.70
Alt 1b year 2	0.63	5.63	3.70
Alt 1b year 3 and beyond	0.17	5.17	1.00
Alt 2 year 1	0.56	5.56	3.29
Alt 2 year 2	0.56	5.56	3.29

Alternative	24-hr Maximum Concentration (w/o bkgd) ($\mu\text{g}/\text{m}^3$)	24-hr Maximum Concentration (w/ bkgd) ($\mu\text{g}/\text{m}^3$)	Ratio Relative to Alt 1b Year 3 and Beyond (w/o bkgd)
Alt 2 year 3 and beyond	0.46	5.46	2.71
Alt 3 year 1	0.63	5.63	3.70
Alt 3 year 2 and beyond	0.04	5.04	0.24

Notes: A ratio equal to one (1) means equal concentrations. A ratio less than 1 means a decrease in concentration. A ratio greater than 1 means an increase in concentration relative to the full implementation of alt. 1b.

Table 72. Contributions to PM_{10} concentrations at Flagg Ranch.

Alternative	Contribution (percent)						
	Snowmobile	Snowcoach	Automobile	Light Truck	Heavy Truck	Tour Bus	Shuttle Van
Alt 1b year 1	92.2	0.0	0.0	0.0	6.6	1.2	0.0
Alt 1b year 2	92.2	0.0	0.0	0.0	6.6	1.2	0.0
Alt 1b beyond year 3	0.0	0.1	0.0	0.0	99.9	0.0	0.0
Alt 2 year 1	82.4	0.0	0.0	0.0	17.6	0.0	0.0
Alt 2 year 2	82.4	0.0	0.0	0.0	17.6	0.0	0.0
Alt 2 beyond year 3	92.1	0.0	0.0	0.0	7.9	0.0	0.0
Alt 3 year 1	92.2	0.0	0.0	0.0	6.6	1.2	0.0
Alt 3 beyond year 2	50.2	0.0	0.0	0.0	49.8	0.0	0.0

Except for the full implementation scenario of alternative 3, the maximum 24-hr average PM_{10} concentrations for all the other scenarios are higher than the maximum 24-hr average PM_{10} concentration of the full implementation scenario of alternative 1b. The contributions of snowmobiles are highest in the snowmobile-containing alternatives. None of the predicted 24-hr average PM_{10} concentrations (with the background concentration) exceeds the 24-hr average concentration of the Wyoming or NAAQS of $150 \mu\text{g}/\text{m}^3$.

Total Mobile Emissions

In addition to the air quality dispersion modeling analysis, the total winter season mobile emissions of CO , PM_{10} , NO_x , and HCs inside the park units were estimated. The estimations were based on the winter use scenarios presented in Appendix A of the air quality analysis report (EA 2001) and the traveling emission factors presented in Tables 34 to 37. The following formulation was used:

$$E = EF \times D \times N \quad \text{where} \quad \begin{aligned} E &= \text{emission rate in grams per hour (g/day)} \\ EF &= \text{emission factor in grams per mile (g/vehicle-mile)} \\ D &= \text{round trip distance in miles, and} \\ N &= \text{number of vehicles (vehicle/day).} \end{aligned}$$

The winter year is represented by the two months of January and February because the winter use scenarios estimate the average daily vehicle use for these two months. Table 73 presents the total mobile emissions per alternative. The breakdown of emissions per alternative, location, and vehicle type is presented in Appendix C of the air quality analysis report (EA 2001).

Table 73. Winter use total mobile emissions inside the parks².

Alternative	Year	CO (tpy)	PM ₁₀ (tpy)	NO _x (tpy)	HCS (tpy)
Alt 1a year 1	2002-2003 ^A	1,538	11	19	476
Alt 1a year 2 and beyond	2003-2004 ^A	479	1	19	63
Alt 1b year 1	2002-2003 ^A	1,763	13	20	560
Alt 1b year 2	2003-2004 ^A	1,538	11	19	476
Alt 1b year 3 and beyond	2004-2005 ^A	479	1	19	63
Alt 2 year 1	2002-2003 ^B	2,061	16	36	685
Alt 2 year 2	2003-2004 ^B	2,002	16	35	663
Alt 2 year 3 and beyond	2004-2005 ^B	1,411	10	39	428
Alt 3 year 1	2002-2003 ^A	1,763	13	20	560
Alt 3 year 2 and beyond	2003-2004 ^A	694	1	84	80

Note: tpy = tons per year

^A the winter season would be 110 days in these alternatives

^B the winter season would be 90 days in this alternative

CO emissions varied from 479 tpy to 2,061 tpy per alternative, PM₁₀ emissions from 1.0 tpy to 16 tpy, NO_x emissions from 19.0 tpy to 84 tpy, and HC emissions varied from 63 tpy to 685 tpy per alternative. The lowest CO, PM₁₀, NO_x, and HC emissions occurred in alternative 1b, year 3 and beyond scenario. For the full implementation and beyond years, the highest CO, PM₁₀, and HC emissions occurred in the alternative 2 year 3 and beyond scenario, and the highest NO_x emissions occurred in the alternative 3, year 2 and beyond scenario.

Definition of Impacts

The discussion of impacts of alternatives on vehicle emission exposure focuses on the exposure of employees, visitors, and snowmobile operators and riders to CO and PM₁₀ worst-case air pollutant levels predicted by the air dispersion modeling. The intensity of an impact

is categorized as negligible, minor, moderate, or major relative to the existing condition. For this analysis, the definition and intensity of the impact categories are summarized below. All impacts on air quality and public health are defined as short term (see introduction to *Assumptions and Methods for Evaluating Impacts*).

Table 74. Definition and intensity of impacts to air quality and public health.

Impact Category	Definition
Negligible	The impact on public or employee health is not measurable or perceptible. There is no noticeable change in visibility at any time or place.
Minor	The impact is measurable or perceptible and is localized within a relatively small area. However, the overall exposure would not be affected. There may be noticeable but infrequent and short duration changes in visibility near staging areas.
Moderate	The impact is sufficient to cause a change in exposure, but remains localized. The change is measurable and perceptible but could be reversed. There may be noticeable, frequent and regular changes in visibility near staging areas and heavily traveled routes.
Major	The impact is substantial and highly noticeable. There may be noticeable, frequent, long duration and regular changes in visibility near staging areas and heavily traveled routes. Class one airsheds, or areas within them, are degraded.

Conclusions

The relative impacts of the SEIS proposed winter use alternatives on ambient air quality were assessed by means of atmospheric dispersion modeling of the GYA. The West Yellowstone Entrance, the Old Faithful and Flagg Ranch staging areas, and three road segments (West Entrance-Madison Junction, Flagg Ranch-Colter Bay, and Mammoth-Northeast Entrance) were studied. The total winter mobile emissions also were estimated by alternative.

CO and PM₁₀ maximum concentrations were found to be the highest at the West Entrance compared to the staging areas and road segments. The predicted 1-hr average maximum CO concentration exceeded the Montana National Ambient Air Quality Standard (NAAQS) for the existing conditions (year 1 of Alternatives 2 and 4) at the West Yellowstone Entrance. The predicted 8-hr average CO concentrations of the existing conditions (year 1 of alternatives 1b and 3), year 2 of alternative 1b, and year 1 of alternative 2 exceeded the Montana and NAAQS at the West Yellowstone Entrance. When snowmobiles were present in the vehicle fleet, their contribution to CO and PM₁₀ concentrations were the highest. Most of the predicted maximum CO and PM₁₀ concentrations for alternative 2 were higher than

² These emission estimates include only those that result from "travelling" through the parks. Total emissions may be underestimated for all alternatives because "idle" emissions are not included.

those of the full implementation of alternative 1b, with the exception of those generated at both staging areas. The full implementation scenario of alternative 3 (year 2 and beyond) performs worst at the West Entrance and along the West Entrance to Madison Junction roadway and better at the staging areas than the full implementation scenario of alternative 1b.

CO emissions varied from 479 tpy to 2,002 tpy per alternative; PM₁₀ emissions from 1 tpy to 16 tpy, NO_x emissions from 19 tpy to 84 tpy; and HC emissions varied from 63 tpy to 685 tpy per alternative. The lowest CO, PM₁₀, NO_x, and HC emissions occurred in the alternative 1b, year 3 and beyond scenario. For the full implementation and beyond years, the highest CO, PM₁₀, and HC emissions occurred in the alternative 2, year 3 and beyond scenario, and the highest NO_x emissions occurred in the alternative 3, year 2 and beyond scenario.

Relative to the existing condition, alternatives 1a and 1b would have major beneficial impacts on air quality. Relative to a hypothetical baseline condition in which there are no air quality impacts, these alternatives would have a negligible impact on most of the park, minor adverse impacts along travel corridors, and minor to moderate adverse impacts at staging areas.

Relative to the existing condition, alternative 2 would have moderate beneficial impacts on air quality. Relative to a hypothetical baseline condition in which there are no air quality impacts, this alternative would have a negligible impact on most of the park, minor adverse impacts along travel corridors, and moderate to major adverse impacts at staging areas.

Relative to the existing condition, alternative 3 would have moderate beneficial impacts on air quality. Relative to a hypothetical baseline condition in which there are no air quality impacts, this alternative would have a negligible impact on most of the park, minor adverse impacts along travel corridors, and moderate adverse impacts at staging areas.

THE EFFECTS OF IMPLEMENTING THE ALTERNATIVES ON WILDLIFE

Methods and Assumptions for SEIS

Analyses of impacts to wildlife are limited to alternative features that pertain to oversnow motorized access in the parks and groomed roads and trails for motorized use. The analysis is further limited to those wildlife species for which new information and analysis may alter the assessment of impacts as disclosed in the FEIS, and for which impacts may vary by alternative (see *Impact Topics Addressed* in Chapter III). Based on the proposed actions,

these species include bison and elk. The analysis of impacts to other species contained in the *Environmental Consequences* chapter of the FEIS remains valid; see pages 237-262 of that document.

National Park Service regulations and policies for management of wildlife underlie the analysis determinations presented in the consequence discussions. A summary of this direction (including legislation and executive orders) is presented in Appendix C of the FEIS.

The following sources of information were used to assess the level of impact on wildlife:

- 1) Scientific literature on species' life histories, distributions, habitat selection, and responses to human activities.
- 2) Site-specific information on wildlife species in the parks, including complete and on-going studies (when available), and the professional judgment of park biologists familiar with the management concerns related to individual species. Park-specific information and scientific literature documented in the FEIS on pages 143-158 and 237-262 is hereby incorporated by reference. Alternative 1a in the SEIS contains a review of pertinent, new information available since the publication of the FEIS; subsequent alternative analyses compare and contrast effects relative to alternative 1a.
- 3) A risk assessment, categorized by road segment, depicts the potential risk of impacts to bison and elk from snowmobiles and snowcoaches.

Effects are characterized according to their intensity and scale of impact on wildlife individuals and populations³ (Table 75). Effects that remain essentially unchanged from those disclosed in the FEIS are incorporated by reference. Variations in alternatives that mitigate the impacts of these actions are included and reflected in the statements of effects. See *Chapter III Wildlife*, for a list of definitions used when describing the effects of the alternative actions on wildlife.

Table 75. Definition of impacts to wildlife.

Impact Category	Definition
No Effect	An action that does not affect a species.
No Known Effect	An action that may affect a species elsewhere but for which there are no demonstrated impacts known to occur in the parks.
Adverse Negligible Effect	An action that may affect a population or individuals of a species, but the effect will be so small that it will not be of any measurable or perceptible consequence to the population. Risks are considered low.
Adverse Minor	An action that may affect a population or individuals of a species, but the

³ Definitions are loosely based on ESA impact criteria that differentiate between levels of effects based on their degree of measurability or detectability.

Impact Category	Definition
Effect	effect will be small; if it is measurable, it will be a small and localized consequence to the population. Risks are considered low to medium.
Adverse Moderate Effect	An action that will affect a population or individuals of a species; the effect may be measurable and may have a sufficient consequence to the population but is more localized. Risks are considered medium.
Adverse Major Effect	An action that will noticeably affect a population or individuals of a species; the effect will be measurable and will have a substantial and possible permanent consequence to the population. Risks are considered high.

Effects Common to All Alternatives

Effects of oversnow motorized sound

Animals may exhibit physiological and behavioral responses to human-caused noise. For a literature review of the effects of noise on wildlife see page 222 in the FEIS. An analysis of these effects is implicit in the assessment of motorized use for each alternative. It can be inferred that as the level, location, and type of motorized use changes, so will the associated effects of motorized sound. An analysis of how the natural soundscape is impacted by alternative is included in this chapter.

Effects of oversnow motorized use

Alternatives 1a and 1b provide for the use of mass-transit snowcoaches; alternatives 2 and 3, while retaining the use of snowcoaches, provide for the use of snowmobiles. Effects associated with oversnow motorized use include disturbance to wildlife from the sight, sound and smell of the machines, and the presence of groomed roads and trails to facilitate their use. Conclusions related to the effects of oversnow motorized use did not change from those presented in the FEIS for alternatives that feature comparable numbers of oversnow motorized vehicles.

General Effects

Winter recreation activities take place during the season when animals are stressed by climate and food shortages. Disturbance or harassment of wildlife during this sensitive time can have a negative effect on individual animals and, in some cases, populations as a whole (Moen et al. 1982). Human activities may provoke the following responses: elevation of heart rate and metabolism; elevated stress hormones (i.e., glucocorticoids); flight;

displacement from habitats; reduced reproduction; increased susceptibility to predation; and diminished health as a result of increased energy costs (Creel et al. 2001; Hardy et al. 2001; Moen et al. 1982; Geist 1978; Cassier et al. 1992; Picton 1999; Aune 1981). Because many of these responses are difficult to detect, animals that may appear unaffected by human activities may nonetheless be suffering from adverse effects. In YNP's Madison, Firehole, and Gibbon River valleys, Aune (1981) reported that wildlife developed crepuscular patterns in response to winter recreation activity, were displaced from trailsides, and that their movements were inhibited by traffic and snow berms created by plowing and grooming operations. Conversely, animals may be able to habituate over time to human activities, providing that such activities are conducted in a predictable and regular manner. Habituation has been defined as a waning of behavioral response to a repeated stimuli (Whittaker and Knight 1998). Habituation may occur when flight or displacement are not possible (e.g., in critical or limited winter range, during severe winters when the snowpack is deep, or when the weakened physical state of the animal precludes it). Although habituated ungulates may fail to exhibit overt behavioral responses, research has shown that physiological responses, including an increase in heart rates, may occur and can result in high energy expenditures (Canfield et al. 1999). Increases in energy expenditures during the stressful winter period are considered deleterious to the overall physical condition of the animal.

The Effects of Implementing Alternative 1a— No Action on Wildlife

Ungulates (Elk and Bison)

Effects of oversnow motorized use. The use of motorized oversnow vehicles can cause injury and death for wildlife, habitat displacement, behavioral changes and physiological stress responses. This alternative would restrict public oversnow access to snowcoaches. In YNP, all existing groomed routes would be available for snowcoach use, and in GTNP, snowcoaches would be allowed on the groomed surface of the road from Colter Bay to Flagg Ranch, north to YNP, and on the Grassy Lake Road. The winter use season would run from approximately late November to mid-March, and all groomed roads would be closed to public entry by March 15 (latest closing date).

Because the annual number of road killed ungulates caused by oversnow vehicles was estimated at less than 1% of each species' total population (Gunther et al. 1998) impacts related to road kills are considered none to negligible and short term (see pages 239-241 in the FEIS for a review of collision impacts). Despite the small number of road killed ungulates relative to the size of their populations, NPS is concerned about impacts to

individuals and seeks to minimize collisions caused by motorized vehicles of all kinds. Because snowmobiles are responsible for all oversnow-wildlife collisions to date (Gunther, pers. comm.), eliminating their use would decrease the potential for collisions to nearly zero. Conversely, alternatives that increase oversnow traffic in wildlife winter range (where the majority of collisions occur) would likely increase the frequency of road killed wildlife (Gunther et al. 1998).

Human activities that result in displacement of animals from parts of their home range may be considered a form of habitat fragmentation. In particular, increased access into elk winter range as provided by plowed and groomed roads may reduce the overall scale and effectiveness of elk habitat, and lead to increased harassment and energetic stress (Picton 1999). In YNP, Hardy et al. (2001) documented that elk may have been displaced from suitable roadside habitat along the busiest winter road in the park (West Yellowstone to Old Faithful) in part due to high volumes of oversnow motorized vehicles. Therefore it may be concluded that the greater the number of oversnow vehicles in wildlife winter range, the higher the risk of harassment and displacement. Consequently, because the alternatives vary in the number of allowable oversnow motorized vehicles on various road segments, risks to wildlife would be expected to vary by road segment as well.

To assess this level of risk among the alternatives, road segments in YNP were categorized as being of “High”, “Medium,” and “Low” risk for wildlife conflicts based on the YNP employee survey described in *Chapter III Wildlife*. Identified conflicts were associated with oversnow motorized use and included animals being herded down roadways, animals being prevented from crossing roads, and animals fleeing from oversnow motorized activities. For each road segment, risk was predicated on the perceived number of wildlife conflicts reported along each road segment and the projected average daily number of oversnow vehicles.

“High” risk segments were those that were reported by the majority of respondents to have daily occurrences of conflicts between wildlife and oversnow motorized vehicles.

“Medium” risk segments were those that had weekly conflicts, and “Low” risk segments were those that had monthly conflicts. Because the survey results represent current condition, alternatives presented in the SEIS that modify use numbers alter the assessment of risks relative to the current condition (Table 76). For each alternative, the number of estimated oversnow vehicles on each road segment was compared to the number and risk rating under the current condition. Where numbers approximated the current condition, the

associated risk did not change. Conversely, where numbers were lower or higher than the current condition, the potential risk associated with that segment changed accordingly.

Alternative 1a prohibits the use of snowmobiles. Therefore the overall number of oversnow vehicles in YNP would be greatly reduced. Consequently, along road segments where risk was rated as “High” or “Medium” under the current condition, risk would decline. This was true of the segments from the West Entrance to Old Faithful, Canyon Village to Fishing Bridge, and Fishing Bridge to the East Entrance. The remaining segments were all currently rated as “Low”; further reduction of numbers on these segments would not be expected to change the potential risk. To summarize, the risk assessment for 1a indicates that for road segments that currently have a high risk for wildlife-oversnow motorized use conflicts, risks greatly decrease due to the elimination of snowmobiles specifically, and the overall reduction in traffic volumes generally.

In YNP, both Hardy et al. (2001) and Aune (1981) concluded that bison and elk habituated to snowmobiles to some degree as exposure to traffic increased throughout the winter recreation season. However both of these studies and Bjornlie (2000) reported that when behavioral responses were elicited, they most often resulted in the bison fleeing, with snowmobiles frequently herding them down the packed trails. To provide an index of physiological stress, Hardy et al. (2001) measured fecal glucocorticoid (FGC) levels and found them to be higher in bison and elk during wheeled vehicle travel as opposed to snowmobiles or snowcoaches. FGC levels in elk increased as traffic entering the West Yellowstone gate exceeded 7,500 cumulative vehicles subsequent to the opening of the spring season. When comparing elk responses to various levels of oversnow traffic, FGC levels were found to be greater in elk that occurred near the busiest oversnow road in the park (West Yellowstone to Old Faithful) than other less frequented roads. While acknowledging that elk FGC levels could potentially increase depending upon winter visitation levels and management scenarios, and despite documented effects, Hardy et al. (2001) concluded that overall, elk and bison were co-existing with winter recreation without declines in population levels.

Table 76. Relative risks associated with each road segment as based on a YNP employee survey related to wildlife and oversnow motorized use conflicts. “High” indicates daily occurrences of conflicts between wildlife and oversnow motorized traffic; “Medium” indicates weekly conflicts; and “Low” indicates monthly conflicts.

Road Segments	Current Condition			Alternatives 1a and 1b			Alternative 2			Alternative 3		
	Risk	Coach	'Bile	Risk	Coach	'Bile	Risk	Coach	'Bile	Risk	Coach	'Bile
West Entrance to Madison	High	9	554	Low	88	0	High	10	533	Medium	33	352
Madison to Old Faithful	High	10	489	Low	80	0	High	10	802	High	33	574
Old Faithful to West Thumb	High	4	209	Low	34	0	High	4	337	High	5	241
Fishing Bridge to East Entrance	High	0	36	Low	5	0	High	0	222	High	0	111
Canyon Village to Fishing Bridge	Medium	3	148	Low	24	0	High	3	243	Medium	3	174
Madison to Norris	Low	5	247	Low	40	0	Medium	5	406	Low	12	290
Mammoth to Norris	Low	3	31	Low	8	0	Medium	3	111	Medium	3	111
West Thumb to Flagg	Low	4	176	Low	29	0	High	4	533	Medium	5	426
Fishing Bridge to West Thumb	Low	3	125	Low	20	0	Medium	3	205	Low	3	147
Norris to Canyon	Low	4	185	Low	30	0	Medium	4	300	Low	4	215

In contrast, Creel et al. (2001) found that FGC levels in YNP elk were higher in response to snowmobiles as opposed to wheeled vehicles, and that day-to-day variation in FGC levels paralleled variation in the number of oversnow vehicles (of which snowcoaches constituted 2% of the total number). Although the two studies are not directly comparable due to differences in methodology, the Creel et al. study demonstrates that oversnow traffic may indeed be affecting elk in YNP, depending perhaps upon other variables (e.g., the year the data were collected there was an unusually heavy snowpack). Nonetheless, Creel et al. found no evidence that current snowmobile levels were affecting elk populations as a whole.

This alternative reduces the potential effects on ungulates by eliminating snowmobile use. A minor risk of collision and short term stress-induced movement would continue with the use of snowcoaches. However, compared to current levels of snowmobile use, traffic levels would be reduced by a factor of eight or more and NPS policy would require that snowcoach drivers be trained to recognize potential wildlife conflicts and instructed to stop only in areas where wildlife would be unaffected. In all parks, collisions would further be mitigated by the prohibition on oversnow motorized use from 9 P.M. to 8 A.M.

The effects analysis in the FEIS under alternative G remains valid: given an analysis of the available data, the level of effects related to oversnow motorized use on ungulates range from none to negligible (collisions) to minor and short term (harassment and displacement).

Effects of groomed roads and trails for motorized use. Packed trails may influence wildlife movements and distributions by facilitating travel into areas that would normally be inaccessible due to deep snow. Under alternative 1a, YNP would groom a total of 184 miles for motorized use, and GTNP and the Parkway would groom about 23 miles for motorized use. Adaptive management would be employed in all alternatives to evaluate the effects of winter recreation on wildlife and to formulate management alternatives if necessary.

Preliminary standards for adaptive management under alternative 1a are based on park policies, regulations and Executive Orders that state a “no disturbance” or “no adverse effects” criteria when assessing the impacts of park actions on wildlife.

The primary concern under this impact topic is the effect of groomed routes on bison (and to a lesser degree, elk) in YNP. Specifically, two issues remain speculative: 1) does bison use of groomed routes affect their population dynamics and distribution, and 2) is the energy saved by walking on these packed surfaces greater than that expended during responses to

traffic encountered along these routes. Pages 238-239 in the FEIS contain a review of these issues. Since the publication of the FEIS, ongoing monitoring of the bison population continues to support the contention that bison use of groomed routes is relatively minor compared to their use of established game trails and other off-road travel corridors (Reinertson et al. 2001). The degree to which this use influences the bison population is disputable and under study.

The effects analysis in the FEIS under alternative G remains valid. Impacts related to the existence of groomed roads and trails remain largely unknown at this time. The parks are committed to ongoing monitoring of bison and elk to obtain addition information regarding this important topic.

Conclusion

Conclusions described in the FEIS on page 422 remain valid. The potential for adverse impacts to elk and bison from oversnow motorized use under alternative 1a range from none to minor, and all would be considered short term. Specifically, there would be an expected reduction or elimination of road killed large mammals due to the elimination of snowmobiles in the parks. In addition, the replacement of individual snowmobiles with mass transit snowcoaches would serve to decrease potential risks associated with disturbance along particular road segments by greatly reducing traffic volume. Adaptive management would be employed to make adjustments in management if and when impacts to wildlife are determined. In summary, although impacts from winter recreation on individual animals would continue to occur and are adverse, most likely they would not result in long term effects to the bison and elk population in the parks.

Summary of Effects on Elk and Bison

Effects of motorized oversnow use of groomed and ungroomed roads and trails on:

- mortality caused by collisions — adverse, none to negligible and short term;
- harassment and displacement from preferred habitats — adverse, negligible to minor and short term;
- FGC levels — unknown to what extent stress may be affecting populations in the long term.
- effects of groomed roads and trails on animal movements — unknown if and to what extent beneficial effects outweigh negative effects.

Effects of Implementing Alternative 1b on Wildlife

All effects described under alternative 1a remain unchanged. The principle difference between alternatives 1a and 1b is that under alternative 1b, implementation would be delayed one year. Consequently, snowmobiles would be phased out by 50% beginning 2003-2004, and beginning 2004-2005 access would be limited to snowcoaches only.

The Effects of Implementing Alternative 2 on Wildlife

Ungulates (Elk and Bison)

Effects of motorized oversnow use. The use of motorized oversnow vehicles can cause injury and death for wildlife, habitat displacement, behavioral changes and physiological stress responses. Under alternative 2, these effects are associated with about 184 miles of groomed road surface in YNP and about 35 miles of groomed surface for motorized use in GTNP and the Parkway, including Grassy Lake Road, and the CDST. In YNP, the speed limit would be lowered to 35 mph from the West Entrance to Madison and Old Faithful and oversnow travel would be prohibited from 8 P.M. to 7:30 A.M. (8:30 A.M. through the West Entrance). Snowcoaches would be permitted in the park beginning mid-November; access to snowmobiles would occur from mid-December to mid-March dependent upon adequate snow conditions (see *Actions for Yellowstone National Park*, Chapter II. in this document).

Because the use of snowmobiles would be allowed in the parks under alternative 2, overall associated effects would increase relative to alternative 1a. To assess the potential level of risk along each road segment by alternative, road segments in YNP were categorized as being of “High”, “Medium,” and “Low” risk for wildlife conflicts based on the YNP employee survey described in Chapter III and described above under the wildlife analysis in alternative 1a. Identified conflicts were associated with oversnow motorized use and included animals being herded down roadways, animals being prevented from crossing roads, and animals fleeing from oversnow motorized activities. For each road segment, risk was predicated on the perceived number of wildlife conflicts reported along each road segment and the projected average daily number of oversnow vehicles.

Relative to the current condition and alternatives 1a and 1b, risks to wildlife from oversnow motorized use in alternative 2 increase along every road segment due to the increase in traffic volumes (Table 20). Six of the ten segments were rated as “High” indicating that conflicts among wildlife and oversnow vehicles would be expected to occur daily. The remaining four segments were rated as “Medium” with traffic volumes increasing over the

current condition by approximately 100 or more vehicles per day on each segment. “Medium” risk indicates that conflicts would be expected to occur weekly on these segments. To summarize, the risk assessment for alternative 2 indicates that for road segments that currently have a high risk for wildlife-oversnow motorized conflicts, risks would remain high, and for segments where risk is currently considered low or medium, risks would increase to medium or high.

Several alternative actions and implementation features of this alternative serve to mitigate the increase in traffic volume on wildlife. Specifically, lower speed limits are proposed from the West Entrance to Madison and Old Faithful, late night travel is prohibited, and increased visitor education and ranger patrols would occur. In addition, when snow depth warrants and at periodic intervals, routine plowing operations would include laying back roadside snowbanks that could be a barrier to wildlife exiting the road corridor (an action common to all alternatives).

Effects of groomed roads and trails for motorized use. Packed trails may influence wildlife movements and distributions by facilitating travel into areas that would normally be inaccessible due to deep snow. Under alternative 2, YNP would groom 184 miles of motorized routes and GTNP and the Parkway would groom 35 miles of motorized routes, including the Grassy Lake Road and the CDST. Adaptive management would be employed in all alternatives to evaluate the effects of winter recreation on wildlife and to formulate management alternatives if necessary. Preliminary standards for adaptive management under alternative 2 are based on a determination of significant adverse effects that are considered “greater than negligible” as determined by NPS biologists.

The effects of groomed routes would increase slightly from alternative 1a due to the addition of the CDST. However because the CDST does not pass through elk or bison winter range, effects related to these particular species would not change. As stated in alternative 1a, whether or not groomed routes confer adverse impacts upon ungulate distributions and population dynamics is speculative and remains under investigation.

Conclusion

Overall, effects increase relative to alternative 1a because snowmobiles are allowed in the parks on all existing motorized routes except the Teton Park Road. Specifically, road kill mortality caused by oversnow vehicles would be greater (the occurrence is historically limited to snowmobiles only), risks associated with harassment and displacement would

increase, and physiological stress responses would rise due to higher traffic volumes. The importance assigned to these effects is in dispute and the ramifications inconclusive. Although winter recreation within the park has not clearly demonstrated any long term adverse consequences to populations, park policies, regulations, and Executive Orders clearly state that disturbance to wildlife, regardless of population-level effects, is unacceptable in the national parks. Under alternative 2, potential impacts to wildlife would be mitigated by lowering the speed limit to 35 mph from the West Entrance to Madison to Old Faithful, increasing ranger patrols, and offering education programs on winter use to all users.

Summary of Effects on Elk and Bison

Effects of motorized oversnow use on:

- mortality caused by collisions — adverse, negligible, and short term;
- harassment and displacement from preferred habitats — adverse, moderate, and short term;
- FGC levels — unknown to what extent stress may be affecting populations in the long-term. Effects are greater than alternative 1a due to the addition of snowmobiles.
- Effects of groomed roads and trails on animal movements — unknown if and to what extent beneficial effects outweigh negative effects.

The Effects of Implementing Alternative 3 on Wildlife

Ungulates (Elk and Bison)

Effects of motorized oversnow use. The use of motorized oversnow vehicles can cause injury and death for wildlife, habitat displacement, behavioral changes and physiological stress responses. Under alternative 3, these effects are associated with about 184 miles of groomed road surface in YNP and about 35 miles of groomed surfaces for motorized use in GTNP and the Parkway. In YNP, only snowcoaches would be allowed on certain groomed motorized routes (e.g., Fountain Flats Road) and snowmobile access would only be permitted when accompanied by an NPS permitted guide. The winter use season would run from late November to mid-March, with early season travel limited to snowcoaches until sufficient snow has accumulated, and late season travel (following Presidents' Day weekend) limited to snowcoaches and nonmotorized travel only. Oversnow travel would be prohibited from 8 PM to 7:30 AM, and in GTNP snowmobile use would not occur on the Teton Park road and the frozen surface of Jackson Lake.

Because the use of snowmobiles would be allowed in the parks under alternative 3, overall associated effects would be increased relative to alternative 1a. To assess the potential level of risk among the road segments by alternative, road segments in YNP were categorized as being of “High”, “Medium” and “Low” risk for wildlife conflicts based on the YNP employee survey described in *Chapter III* (Table 20) and described under the wildlife analysis in alternative 1a of this document. Identified conflicts were associated with oversnow motorized use and included animals being herded down roadways, animals being prevented from crossing roads, and animals fleeing from oversnow motorized activities. For each road segment, risk was predicated on the perceived number of wildlife conflicts reported along each road segment and the projected average daily number of oversnow vehicles.

Relative to the four road segments currently rated as “High”, all but one segment would remain “High” under alternative 3. “High” indicates that conflicts among wildlife and oversnow vehicles would be expected to continue to occur daily without mitigation. The exception is the segment from the West Entrance to Madison where the average number of vehicles would be reduced by 178 under this alternative. However the reduction in vehicles, and hence risk, along this segment may be made up for on other segments where the number of expected vehicles would rise due to redistributed use throughout the park. For example, risks increase from “Low” to “Medium” from Mammoth to Norris and West Thumb to Flag as a result of increased traffic volume. For the remaining three segments currently rated as “Low”, risk would remain “Low” in alternative 3 because traffic volumes would not be expected to significantly change.

Effects related to increased traffic volumes including disturbance and harassment would be mitigated by the stipulation that permitted guides accompany all snowmobilers in YNP. The use of guides would serve to minimize impacts by controlling where and when stops are made, and would prevent snowmobiles from becoming dispersed along the roadway. In addition, when snow depth warrants and at periodic intervals, routine plowing operations would include laying back roadside snowbanks that could be a barrier to wildlife exiting the road corridor (an action common to all alternatives).

Effects of groomed roads and trails for motorized use. Packed trails may influence wildlife movements and distributions by facilitating travel into areas that would normally be inaccessible due to deep snow. Under alternative 3, YNP would groom all existing routes (184 miles) and only snowcoaches would be allowed on certain side roads (e.g., Fountain

Flats Road). GTNP and the Parkway would groom 35 miles of motorized routes, including the Grassy Lake Road and the CDST. Adaptive management would be employed in all alternatives to evaluate the effects of winter recreation on wildlife and to formulate management alternatives if necessary. Preliminary standards for adaptive management under alternative 3 are based on a determination of adverse effects that are considered “greater than negligible” as determined by NPS biologists.

Similar to alternative 2, the effects of groomed routes would increase slightly from alternative 1a due to the addition of the CDST. However because the CDST does not pass through elk or bison winter range, effects related to these particular species would not change. As stated in alternative 1a, whether or not groomed routes confer adverse impacts upon ungulate distributions and population dynamics is speculative and remains under investigation.

Conclusion

Overall, effects increase relative to alternative 1a because snowmobiles are allowed in the parks on all major existing motorized routes except the Teton Park Road and Jackson Lake. Specifically, road kill mortality caused by oversnow vehicles would be greater (the occurrence is historically related to snowmobile use only), risks associated with harassment and displacement would increase, and physiological stress responses would rise due to higher traffic volumes. The importance assigned to these effects is in dispute and the ramifications inconclusive. Although winter recreation within the park has not clearly demonstrated any long term adverse consequences to populations, park policies, regulations, and Executive Orders clearly state that disturbance to wildlife, regardless of population-level effects, is unacceptable in the national parks. Under alternative 3, potential impacts to wildlife would be mitigated by permitting snowmobile access only when accompanied by an NPS permitted guide, restricting access on side roads to snowcoach only, and prohibiting nighttime oversnow travel. These features, along with fewer snowmobiles, decrease effects relative to alternative 2.

Summary of Effects on Elk and Bison

- Effects of motorized oversnow use on:
- mortality caused by collisions – adverse, negligible, and short term;
- harassment and displacement from preferred habitats – adverse, moderate, short term; and
- FGC levels — unknown to what extent stress may be affecting populations in the long-term. Greater than alternative 1a.

- Effects of groomed roads and trails on animal movements — unknown if and to what extent beneficial effects outweigh negative effects.

THE EFFECTS OF IMPLEMENTING THE ALTERNATIVES ON THE NATURAL SOUNDSCAPE

Summary of Changes in Impacts Between FEIS and SEIS

Specific impact estimates were calculated for the SEIS alternatives, corresponding to estimates for seven alternatives evaluated in the FEIS. For purposes of comparison, SEIS estimates are displayed below along with modeled results from alternatives A, B and D from the FEIS. Alternative A represents existing conditions and management, prior to implementation of the current decision. Alternatives B and D both prescribed objectives for quieter snowmobiles to address issues relating to impacts on the soundscape.

Table 77: Modeled sound impacts for SEIS alternatives compared to selected FEIS alternatives.

SEIS and FEIS Alternatives	Oversnow Road Segments where Average Noise level exceeds 50dB at 100 ft	Acres where Noise is Audible	Δ from existing
FEIS Alternative A (Existing Condition)	Average Noise Levels are highest due to oversnow use from W. Entrance to Old Faithful at 56dB, and on Jackson Lake at 58dB. Average noise level exceeding 50dB at 100ft is found at any point along 9 road segments, or on 144 miles of groomed road.	Less than 10% of the time: 200,700 More than 10% of the time: 107,400 More than 50% of the time: 26,500	0% 0% 0%
SEIS Alternatives 1a and 1b	Average noise level does not exceed 50 dB at 100ft on any road segment. Level is highest due to oversnow use from W. Entrance to Old Faithful at 49dB.	Less than 10% of the time: 199,000 More than 10% of the time: 95,060 More than 50% of the time: 14,090	<-1% -11% -47%
SEIS Alternative 2	Average Noise Levels are highest due to oversnow use from W. Entrance to Old Faithful at 55-56dB. Average noise level exceeding 50dB at 100ft is found at any point along 12 road segments, or on 172 miles of groomed road.	Less than 10% of the time: 182,540 More than 10% of the time: 124,770 More than 50% of the time: 53,090	-9% +16% +100%
SEIS Alternative 3	Average Noise Levels are highest due to oversnow use from W. Entrance to Old Faithful at 54-55dB. Average noise level exceeding 50dB at 100ft is found at any point along 8 road segments, or on 134 miles of	Less than 10% of the time: 175,700 More than 10% of the time: 115,030 More than 50% of the	-12% +7% +37%

SEIS and FEIS Alternatives	Oversnow Road Segments where Average Noise level exceeds 50dB at 100 ft	Acres where Noise is Audible	Δ from existing
	groomed road.	time: 36,270	
FEIS Alternative B	Average Noise Levels are highest due to oversnow use from Old Faithful to Flagg Ranch at 50dB. Average noise level exceeding 50dB at 100ft is found at any point along 3 road segments, or on 51 miles of groomed road.	Less than 10% of the time: 149,600 More than 10% of the time: 68,300 More than 50% of the time: 16,400	-25% -36% -38%
FEIS Alternative D	Average Noise Levels are highest due to oversnow use from W. Entrance to Old Faithful at 43dB and on Jackson Lake at 54dB. Average noise level exceeding 50dB at 100ft is found only on Jackson Lake.	Less than 10% of the time: 119,800 More than 10% of the time: 62,800 More than 50% of the time: 14,900	-40% -42% -44%

Analysis Methods and Assumptions

Review of Differences Among Alternatives Relevant to Noise Modeling

Alternative 1a: This alternative has exactly the same inputs, assumptions and results as alternative G in the FEIS. For purposes relating to this analysis, all discussion of SEIS alternative 1b applies to alternative 1a as well.

Alternative 1b: This alternative has exactly the same inputs, assumptions and results as alternative G in the FEIS. No snowmobiles are present in this alternative, and an increased number of snowcoaches are assumed in their stead. Two types of snowcoaches are assumed, including the older Bombardier vehicles and the newer 4-track conversion van snowcoaches. Appendix A of the HMMH Report (January 2002) provides a breakdown of the vehicle volumes used in the modeling. There are no oversnow vehicles on several road segments (Mammoth to Northeast Entrance, Colter Bay to Moran Junction, Moran Junction to East Entrance, and Moran Junction to South Entrance), and the Teton Park Road, Antelope Flats and Jackson Lake are closed to all motor vehicles. In the models, snowmobiles are assumed to be traveling at a constant speed of 40 mph; and snowcoaches are assumed to be traveling at 30 mph in the modeling.

Alternative 2: Alternative 2 assumes a 75 dBA limit on the noise emissions (at 50 ft) of over-snow vehicles. It further assumes that the quietest available snowmobiles will be used; the noise emissions of those snowmobiles are 1.2 dBA lower than those used in the FEIS (details are given below). For snowcoaches, the same noise emissions and approximate ratio

of vehicle types were assumed as in alternative 1b (vehicle volumes are shown in Appendix A of the HMMH Report (January 2002)). One other difference in alternative 2 is that a 35 mph speed limit has been assumed for Segment 3 – West entrance to Madison and Segment 9 – Madison to Old Faithful therefore, snowmobiles were modeled at 35 mph instead of 40 mph, which was used for all other segments and alternatives. The snowmobile noise emission level at 35mph is about 0.7 dBA lower than at 40 mph. Snow coaches are still modeled at 30 mph. Of the road segments in alternatives 1a and 1b with no oversnow vehicles or no vehicles, in alternative 2 snowmobiles are modeled on the Colter Bay to Moran Junction and the Moran Junction to East Entrance segments.

Alternative 3: This alternative assumes the quietest available technology will be used for all oversnow vehicles. The noise emission for snowmobiles is 1.2 dBA lower than that modeled in the FEIS, the same as in alternative 2. For snowcoaches, only the 4-track conversion van vehicles were modeled in alternative 3, because they are the quietest available technology, with a sound level of 70 dBA at 50 ft, as compared with 75 dBA for the Bombardier. Speeds assumed for oversnow vehicles are the same as in alternatives 1a and 1b. Of the road segments in alternatives 1a and 1b with no oversnow vehicles or no vehicles, changes in alternative 3 include snowmobiles modeled on the Colter Bay to Moran Junction and the Moran Junction to East Entrance segments (see Appendix A of the HMMH report (January 2002) for vehicle volumes).

Oversnow vehicle noise emission levels

This section describes the selection of the vehicle noise emission levels that were used for modeling quietest available technology vehicles in alternatives 2 and 3. Since the FEIS was released, additional measurements of oversnow vehicles were conducted by Jackson Hole Scientific Investigations, Inc.⁴ Data collected during these measurements were evaluated and used to support the selection of vehicle noise emission levels for the Draft Supplemental EIS. While both the data sets developed by Harris Miller Miller & Hanson Inc./Bowlby & Associates and by JHSI show a 1.2 dBA difference between average and quiet vehicles at a speed of 40 mph, that difference derives from measurements of a small number of quiet vehicles at a variety of speeds and conditions. Additional noise data will be collected in February 2002 to better quantify the noise emissions from the quietest available vehicles. This data will be reported and analyzed in the Final SEIS.

Oversnow vehicle measurements supporting the Draft and Final EIS

Harris Miller Miller & Hanson Inc. (HMMH) conducted controlled reference vehicle pass-bys of several oversnow vehicles during the winter 2000 sound measurement program conducted for the FEIS. Section 3.2.3 of the FEIS noise technical report describes the measurement procedures and results. Digital audio tape (DAT) recordings of constant-speed vehicle pass-bys at 50 ft were processed into 1/3 octave band spectra, resulting in the spectrum that occurs at the maximum A-weighted sound level. The measurements were conducted over snow typical of the parks in mid-winter, with ANSI Type I “Precision” Instrumentation. Measurements of three snowmobiles (one in two different gears) and five different snowcoaches were obtained at speeds ranging from 10 mph to 35 mph. All snowmobiles had 2-stroke engines.

Bowlby & Associates conducted A-weighted snowmobile pass-by measurements of several vehicles at different speeds in Grand Teton National Park in the winter of 1996⁵. The higher speed data from these measurements (45 to 55 mph) were used to supplement the HMMH measurements to develop a regression line of maximum pass-by level as a function of speed. This line and the data set supporting it are shown in Figure 33 in the FEIS noise technical report⁶. The regression line was used for the snowmobile sound levels in the model for the FEIS. All snowmobiles in the FEIS were modeled at a speed of 40 mph. The regression line crosses slightly above 73.9 dBA at 40 mph; a rounded level of 74 dBA was therefore used for the modeling of all snowmobiles. The spectrum shape chosen to represent this A-level was one of a 2000 Polaris 500 cc snowmobile pass-by at 35 mph (the maximum A-level of this particular pass-by was 72.4 dBA, so the entire spectrum was adjusted up by 1.6 dB therefore that it would sum to 74 dBA.).

HMMH’s measurements of snowcoaches yielded the lowest sound levels for the gasoline-powered 4-track conversion van (“Mattrack”) at 69.7 dBA (30 mph at 50 ft, rounded to 70 dBA for the analysis), and the highest for the Bombardier snowcoaches at 74.6 dBA (30 mph at 50 ft, rounded to 75 dBA for the analysis). A singular characteristic of the Bombardier snowcoach pass-by is a prominent tone at 160 Hz (at 35 mph). The regression lines for the measured A-weighted sound levels of these snowcoaches are shown as Figures 34 and 35 in the FEIS noise technical report.

⁴ “Over-snow Vehicle Sound Level Measurements, conducted for the Winter Use Plan SEIS for Yellowstone and Grand Teton National Parks and John D. Rockefeller, Jr. Memorial Parkway,” prepared by Jackson Hole Scientific Investigations, Inc., September 2001.

⁵ “1996 Noise monitoring study, Grand Teton National Park and John D. Rockefeller, Jr. Memorial Parkway,” Prepared by Bowlby & Associates, Inc., 1996.

2001 Vehicle Measurements

Jackson Hole Scientific Investigations, Inc. (JHSI) conducted measurements of various over-snow vehicles in September 2001. Due to scheduling limitations, the measurements were conducted over grass instead of snow. Constant-speed pass-by measurements of 18 different snowmobiles and four snowcoaches were conducted at speeds of 20, 35 and 45 mph in accordance with SAE Standard J1161. The approach to these measurements was similar to HMMH's vehicle measurements, but a very significant difference was the ground type. Also, the measurement instrumentation was different. The instrument was an ANSI Type II (General Purpose") sound level meter, consistent with the type of instrumentation that would be used for vehicle noise enforcement. The sound level meter, a Quest Technologies M2100, collects A-weighted sound level data only, so no spectral data was obtained.

The sound level data for snowmobiles is summarized in Table 78 in the JHSI report. All two-stroke vehicle pass-bys are averaged, resulting in an sound level of 75.5 dBA at 35 mph and 77.3 dBA at 45 mph. The one four-stroke snowmobile measured 74.1 dBA at 35 mph and 76.2 dBA at 45 mph, quieter than any of the averages of sub-groups of two-stroke machines shown in the JHSI report. Therefore, the quiet 4-stroke machine was 1.4 dB quieter than the average two-stroke machine at 35 mph, and 1.1 dB quieter at 45 mph.

JHSI measured sound levels for snowcoaches also. At speeds of approximately 30 mph, the sound levels of the Bombardier, Mattrack 4-track conversion van and Ford full-track conversion van were nearly equal (with both sides averaged) at 78 to 79 dBA. The measured Mattrack van was a diesel-powered 1999 Chevrolet, whereas the previous HMMH study had measured a gasoline-powered Mattrack.

Measurement comparisons

Vehicle pass-by sound levels measured over grass are not directly comparable to pass-by levels measured over snow. The significant difference in the impedance of the ground surface (characterized as effective flow resistivity) would be expected to yield significant differences in the measured sound levels. This is due to the interference between the direct sound path and the sound path reflected from the ground; the effect of the softer snow is to reduce the sound level at the receiver. (Sound propagation is discussed in more detail in Section 3.2.2 of the FEIS noise technical report, and further in sound-propagation references given in that report.) Therefore, the JHSI measurements would be expected to be higher by

⁶ "Technical Report on Noise: Winter Use Plan FEIS." HMMH Report #295860.18 June 2001.

several decibels than the measurements conducted over snow by HMMH and Bowlby & Associates (B&A). The exact difference in sound levels between sound propagation over snow and over grass depends strongly on both the height of the sound source(s) above the ground and on the frequency characteristics of the source. Therefore, without detailed information about the source heights and frequency content, it is not possible to compute accurately by how much the A-weighted sound level would differ over the two surfaces, and thereby “adjust” the JHSI data to over-snow conditions.

A possible additional difference between the JHSI measured data and the HMMH/B&A data is the increased friction on grass, especially for vehicles with skis in front. This may cause increased engine load and increased friction on the mechanical components of the sleds, resulting in greater noise (the JHSI report notes that track noise over grass seems louder than over snow).

Although the HMMH and B&A measured pass-by levels and the JHSI measured data are not directly comparable, the differences and trends internal to the JHSI measured data are of interest, as discussed below.

Snowmobiles

An average snowmobile sound level at 40 mph can be computed from the JHSI measurements of the 35 mph and 45 mph data. The average is 76.4 dBA for all of the two-stroke snowmobiles, and 75.2 dBA for the four-stroke snowmobile. Therefore, the quietest technology snowmobile was 1.2 dB quieter than the average snowmobile at 40 mph.

Because noise emission levels for quietest-available technology vehicles were needed for the Supplemental EIS modeling, the HMMH sound data were examined. Spectral data is needed in the modeling exercise (the JHSI study did not include spectral data), and over-snow measurements are preferred, so HMMH’s data was selected. To establish a sound level for quietest-available technology snowmobiles at 40 mph, the quietest vehicles measured at 35 mph and 45 mph were chosen for averaging, since no appropriate 40 mph pass-by measurement was available. The lowest A-weighted sound levels are 71.5 dBA from a 2000 Polaris 500cc Wide Track measured by HMMH in 2000 in high gear at 35 mph, and 74 dBA for a snowmobile measured at 45 mph by B&A in 1996. The average value, to be used for the modeling of quietest-available technology snowmobiles at 40 mph is 72.8 dBA. Notably, this is 1.2 dB quieter than the average vehicle, the same average-to-minimum difference as

found in the JHSI study. The spectrum shape chosen to represent this A-level was the same as that used in the FEIS modeling of snowmobiles, adjusted downward by 1.2 dB.

Because speed will be limited to 35 mph in two segments under alternative 2, an appropriate sound level spectrum was also needed for snowmobiles at 35 mph. The spectrum measured from the 35 mph pass-by of the 2000 Polaris 500cc Wide Track in high gear was chosen; the maximum A-level of that pass-by was 71.5 dBA.

Snowcoaches

In addition to the Bombardier snowcoaches, HMMH measured only the gasoline-powered Mattrack 4-track conversion van over snow, and JHSI measured only the diesel-powered Mattrack van over grass. The diesel-powered van has a higher measured pass-by level, but because of the different ground types, the sound level data from these two vehicles cannot be directly compared⁷.

The quietest measured snowcoach pass-by was the gasoline-powered Mattrack, measured by HMMH in 2000 over snow; the A-level was 70 dBA. This vehicle was modeled in the snowcoach fleet in the FEIS alternatives (In addition to the Bombardier). For alternative G in the FEIS, where more snowcoaches would be purchased, an approximate ratio of five times as many Mattrack snowcoaches were assumed as the older Bombardier coaches. This same mix has been assumed for alternatives 1b and 2 in the SEIS. For snowcoaches in alternative 3, which uses quietest available technology, only the gas-powered Mattracks were modeled.

Summary vehicle sound levels

Table 78 lists the A-weighted maximum pass-by sound levels that were used to model over-snow vehicles. Automobile and bus sound levels are unchanged from the FEIS, and are the same across all alternatives in the SEIS.

Table 78. Over-snow vehicle noise levels used in Draft Supplemental EIS.

Vehicle	Speed, mph	Sound Level at 50 ft over
Snowmobile	40	72.8
Snowmobile	35	71.5
4-Track (gas) Conversion Van	30	70
Bombardier Snowcoach	30	75

⁷ Same day, same condition measurements of the diesel- and gasoline-powered Mattracks vans are planned in 2002 to determine if significant differences in the A-level and/or spectrum shape are present at 30 mph.

Vehicle Volumes and Roadway Segment Details

The average daily vehicle volumes used in the modeling are

in Appendix A of the noise technical report (HMMH January 2002). In brief, alternatives 1a and 1b use only snowcoaches, alternative 2 has both snowmobiles and snowcoaches, and alternative 3 is similar to alternative 2, but has fewer snowmobiles and more snowcoaches. There are also allowable speed differences on two segments in alternative 2, as noted above.

Table 79 provides the details on the segment lengths for each roadway, used in the computation of the number of acres of park land affected by vehicle noise. The table also lists the percentage of each road segment that was modeled as “open terrain” and as “forested terrain.” Details on the soundscape characteristics of the different terrain types can be found in Section 2.4 of the FEIS noise technical report.

Table 79. Roadway segment lengths, percentage open and forested terrain.

Roadway Segment	Length [miles]	Percentage Open [%]	Percentage Forested [%]
1.Mammoth to northeast entrance	47	68	32
2.Mammoth to Norris	21	16	84
3.West entrance to Madison	14	3	97
4.Madison to Norris	14	5	95
5.Norris to Canyon Village	12	0	100
6.Canyon Village to fishing bridge	16	29	71
7.Fishing bridge to east entrance	27	17	83
8.Fishing bridge to West Thumb	21	50	50
9.Madison to Old Faithful	16	6	94
10. Old Faithful to West Thumb	17	0	100
11. West Thumb to Flagg Ranch	24	11	89
12. Grassy Lake Road	7.6	19	81
13. Flagg Ranch to Colter Bay	15.6	40	60
14. Colter Bay to Moran Junction	10.2	25	75
15. Moran Junction to east entrance	2	50	50
16. Moran Junction to south entrance	26	98	2
17. Teton Park Road	15	65	35
18. Moose-Wilson Road	2.5	63	37
19. Jackson Lake	9.7	100	0

Audibility of Single Events

Table 80 presents the computed distances to the limits of audibility of a single pass-by of each vehicle type over snow in the Open and Forested terrain for both the Average and Quiet background conditions. Distances are shown for different sized groups of snowmobiles, since such groups are common. The computations can be interpreted as follows: *beyond* the

distance shown, the vehicle would not be audible; *at* the distance shown, the vehicle would be barely audible for only a few seconds; *closer than* the distance shown, the vehicle would be more clearly audible and for longer.

Because the distances to audibility limits are based on the unique frequency characteristics of the sound sources, the background environments and the human auditory system, comparisons of the A-weighted sound levels alone will not lead to an understanding of differences. Differences in the distances between the average and quiet background conditions are small for snowmobiles, primarily because the frequency of maximum detection is 200 Hz, where the differences in background levels are smaller than the A-weighted sound level differences. The difference in distances between open terrain and forested terrain is generally larger because vehicle sound levels drop off more quickly with distance in the forested environment.

The shortest distances to the limits of audibility are generated by automobiles and by the 4-track conversion van snowcoaches. Reasons are that these vehicles are relatively quiet, they do not show tonal characteristics, and they produce relatively little low-frequency energy.

Table 80. Distances to limits of audibility for individual vehicle pass-bys over snow in open and forested terrain and in average and quiet background conditions.

Vehicle Type	Maximum 50 ft Pass-by Level (dBA)	Distance to Limit of Audibility (feet)			
		Open Terrain		Forested Terrain	
		Average Bkgrnd	Quiet Bkgrnd	Average Bkgrnd	Quiet Bkgrnd
Automobile	68	2,180	2,330	1,130	1,200
Bus	76	5,520	6,090	2,620	2,860
Bombardier Snowcoach	75	8,560	9,690	3,860	4,230
4-Track Conversion Van "Mattrack" Snowcoach	70	2,030	2,200	1,110	1,210
Snowmobile – Quiet Available	72.8	3,490	3,720	1,820	2,030
Group of 2 QA Snowmobiles	72.8 each	4,650	4,970	2,340	2,630
Group of 4 QA Snowmobiles	72.8 each	6,270	6,720	3,030	3,430
Group of 8 QA Snowmobiles	72.8 each	8,570	9,210	3,990	4,540
Group of 12 QA Snowmobiles	72.8 each	10,360	11,150	4,710	5,390

Distances to Audibility Metrics: Cumulative Effects of All Vehicles

The contributions from all vehicles during the day were accounted for, and distances to three metrics of audibility were computed, according to the approach described in Section 3 of the FEIS noise technical report. The three different audibility conditions are: 1) distance to the limit of audibility for all vehicles during the day, 2) distance to where vehicles would be audible 10% of the time or more, and 3) distance to where vehicles (if any) would be audible

50% of the time or more. Choosing these latter two metrics in addition to the distance to the limit of audibility metric allows the following questions to be answered: “How far do you have to go away from a road so that you won’t hear snowmachine noise for more than 10% of the time throughout the day?” and “...for more than half the time?” Another parameter in considering audibility at a distance is the effect of multiple machines. The above table provides comparative figures for groups of machines; a group of 12 snowmobiles is expected to be audible at roughly three times the distance compared to a single snowmobile operating at the same individual pass-by level.

Effects of Alternatives on the Natural Soundscape

Tables 81 through 83 show the distances to audibility for each project alternative. These tables present the distances by road segment within which oversnow or wheeled vehicle sound would be audible under the two background conditions, average and quiet, and in the two terrain types. Where blanks exist in the tables, the vehicles on that segment would not meet that condition. It should be noted that there are no oversnow vehicles in Segments 1 and 14-17 in alternatives 1a and 1b, and no oversnow vehicles in Segments 1, 16 and 17 in alternatives 2 and 3. In those cases, the projected audibility is entirely due to autos, vans, and buses on plowed roads that do not change in any of the alternatives.

Table 81. Distances to Audibility (feet): Alternatives 1a and 1b.

Road Segment	Average background Open terrain			Average background Forested terrain			Quiet background Open terrain			Quiet background Forested terrain		
	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more
Mammoth to Northeast Entrance	3,276	1,406		1,884			3,398	1,637		2,007		
Mammoth to Norris	9,003	1,593		3,744			10,757	3,008		3,906		
West Entrance to Madison	17,810	14,213	8,501	6,210	3,843		21,138	17,244	10,929	6,933	4,404	
Madison to Norris	12,839	9,354		4,953	2,555		14,612	11,603		5,605	3,112	
Norris to Canyon Village	11,846	8,296		3,947	709		13,523	10,389		4,563	1,731	
Canyon Village to Fishing	10,110	7,882		3,774			12,108	9,817		3,939		

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Road Segment	Average background Open terrain			Average background Forested terrain			Quiet background Open terrain			Quiet background Forested terrain		
	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more
Bridge												
Fishing Bridge to East Entrance	8,413			3,727			9,949			3,889		
Fishing Bridge to West Thumb	9,535	7,221	4,091	3,749	3,035		11,044	7,963	4,939	3,915	3,320	
Madison to Old Faithful	17,810	14,079	7,473	6,210	3,804		21,138	17,067	10,057	6,933	4,257	
Old Faithful to West Thumb	12,197	8,688		4,953	2,340		13,735	10,807		5,605	2,872	
West Thumb to Flagg Ranch	11,846	8,258		3,947	496		13,523	10,362		4,563	1,662	
Grassy Lake Road	3,537			2,122			3,666			2,376		
Flagg Ranch to Colter Bay	11,846	8,258		3,947	496		13,523	10,362		4,563	1,662	
Colter Bay to Moran Junction	5,642	2,949		3,058	985		6,281	3,121		3,219	1,159	
Moran Junction to east entrance	6,856	4,132	3,245	3,249	2,079	801	7,428	4,843	3,466	3,453	2,274	947
Moran Junction to south entrance	6,965	4,663	3,580	3,232	2,150	1,031	7,650	5,432	3,803	3,393	2,322	1,258
Teton Park Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Moose- Wilson Road	2,669			1,336			2,785			1,454		
Jackson Lake	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 82. Distances to audibility (feet): alternative 2.

Road Segment	Average background Open terrain			Average background Forested terrain			Quiet background Open terrain			Quiet background Forested terrain		
	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more
Mammoth to Northeast Entrance	3,276	1,406		1,884			3,398	1,637		2,007		
Mammoth to Norris	8,632	3,990		3,736	2,193		10,178	4,714		3,900	2,497	
West Entrance to Madison	12,459	10,707	7,909	3,940	3,416	2,715	14,068	12,151	9,251	4,697	3,725	3,117
Madison to Norris	10,048	7,890	5,915	3,789	3,079	1,414	11,462	9,167	6,757	3,963	3,393	1,996
Norris to Canyon Village	9,580	6,841	3,970	3,779	2,900		11,099	7,604	4,761	3,952	3,202	1,081
Canyon Village to Fishing Bridge	8,947	6,226	3,332	3,743	2,821		10,540	6,987	3,841	3,909	3,111	
Fishing Bridge to East Entrance	7,839	5,497	2,738	3,391	2,711		8,814	6,204	3,277	3,634	2,994	
Fishing Bridge to West Thumb	8,779	5,711	2,572	3,739	2,736		10,323	6,473	3,148	3,903	3,023	
Madison to Old Faithful	13,443	11,869	9,558	4,076	3,616	2,918	14,907	13,254	10,941	5,118	3,935	3,339
Old Faithful to West Thumb	9,958	7,273	4,724	3,793	2,969	900	11,387	8,087	5,603	3,968	3,276	1,511
West Thumb to Flagg Ranch	11,447	9,258	7,289	3,850	3,292	2,530	12,584	10,564	8,235	4,408	3,602	2,937
Grassy Lake Road	5,792	3,164		3,126	677		6,411	3,384		3,297	1,212	
Flagg Ranch to Colter Bay	7,173	4,385		3,288	2,250		7,791	5,116		3,518	2,579	
Colter Bay to Moran Junction	7,333	4,792	2,516	3,278	2,349		7,964	5,524	2,903	3,514	2,666	
Moran Junction to East entrance	8,085	5,851	3,839	3,403	2,566	1,130	9,234	6,603	4,260	3,638	2,855	1,477

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Road Segment	Average background Open terrain			Average background Forested terrain			Quiet background Open terrain			Quiet background Forested terrain		
	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more
Moran Junction to South Entrance	6,965	4,663	3,580	3,232	2,150	1,031	7,650	5,432	3,803	3,393	2,322	1,258
Teton Park Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Moose- Wilson Road	2,669			1,336			2,785			1,454		
Jackson Lake	5,782	2,069		3,125			6,400	2,485		3,295		

Table 83. Distances to audibility (feet): alternative 3.

Road Segment	Average background Open terrain			Average background Forested terrain			Quiet background Open terrain			Quiet background Forested terrain		
	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more
Mammoth to Northeast Entrance	3,276	1,406		1,884			3,398	1,637		2,007		
Mammoth to Norris	8,632	3,990		3,736	2,193		10,178	4,714		3,900	2,497	
West entrance to Madison	13,785	11,429	7,249	5,219	3,581	1,812	15,830	13,399	8,485	5,952	3,860	2,380
Madison to Norris	11,295	8,037	4,358	3,907	3,029	708	13,144	9,599	5,257	4,430	3,340	1,375
Norris to Canyon Village	8,954	5,907	2,882	3,749	2,770		10,498	6,671	3,430	3,916	3,059	
Canyon Village to Fishing Bridge	8,721	5,232	1,182	3,738	2,457		10,287	5,989	2,019	3,902	2,768	
Fishing Bridge to East Entrance	6,572	3,886		3,197	2,154		7,167	4,202		3,393	2,455	
Fishing Bridge to West Thumb	8,654	4,768		3,736	2,290		10,205	5,538		3,900	2,622	
Madison to Old Faithful	14,363	12,734	9,597	5,356	3,728	2,900	16,811	14,410	11,165	6,133	4,098	3,307
Old Faithful to West Thumb	9,435	6,345	3,443	3,770	2,829		11,123	7,115	3,942	3,939	3,120	
West Thumb to Flagg Ranch	10,336	8,072	6,224	3,816	3,113	1,546	11,984	9,450	7,061	3,994	3,427	2,124
Grassy Lake Road	6,413	3,768		3,197	2,106		6,977	3,920		3,383	2,393	
Flagg Ranch to Colter Bay	6,413	3,768		3,197	2,106		6,977	3,920		3,383	2,393	
Colter Bay to Moran Junction	6,510	3,901	1,533	3,176	2,160		7,109	4,266	1,940	3,397	2,448	

Road Segment	Average background Open terrain			Average background Forested terrain			Quiet background Open terrain			Quiet background Forested terrain		
	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more	Audible at all	Audible 10% or more	Audible 50% or more
Moran Junction to east entrance	7,113	5,160	3,563	3,236	2,396	934	7,721	5,900	3,798	3,455	2,661	1,193
Moran Junction to south entrance	6,965	4,663	3,580	3,232	2,150	1,031	7,650	5,432	3,803	3,393	2,322	1,258
Teton Park Road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Moose-Wilson Road	2,669			1,336			2,785			1,454		
Jackson Lake	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Acres of Affected Park Land

The previous section contains tables with distances to audibility metrics for each segment and each alternative. The following section presents the area of park land in acres where any vehicle noise would be audible under the two background conditions, average and quiet. The areas shown in this section are computed by multiplying the distances to audibility presented in the previous section by each roadway segment length. Segment lengths and their percentages of open and forested terrain are presented in Table 80. For each background condition, acreage is presented for three categories of audibility: (1) audible for any amount of time (labeled “Audible at all”), (2) audible for 10% of the time or more, and (3) audible for 50% of the time or more.

Alternatives 1a and 1b: Effects by roadway segment

Table 84 through Table 86 below provide details on the affected acreage for each roadway segment and project alternative, showing where this acreage occurs. For alternatives 1a and 1b, of particular note is the limited acreage in the parks where snowmachines would be heard 50% of the time or more. Only along the plowed road segment between Moran Junction and the South Entrance, where only wheeled vehicles are allowed, are there a significant number of acres affected.

If the acres for the Moran Junction to South Entrance segment were removed (because wheeled vehicles on this plowed road segment are not affected by the SEIS alternatives), total acreages shown for alternatives 1a and 1b would change. The following table compares areas affected with and without wheeled vehicles.

Table 84. Comparison of total acres affected where vehicles would be audible, alternatives 1a and 1b, separating out wheeled vehicle impacts.

Impacts on Segments:	Acres of affected Park land where vehicles would be audible					
	Average background conditions			Quiet background conditions		
	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more
Including wheeled-vehicle impacts	178,445	74,795	12,916	199,062	95,060	14,087
Without wheeled-vehicle traffic	156,731	60,259	1,793	175,220	78,138	2,262

The most dramatic changes due to removing the plowed road segment are in the columns for audible 50% or more, where that segment is the only one with significant acreage. Also, the most dramatic differences between the alternatives are also evident in those columns, areas that could be considered to have the greatest impact. In the 50% or more audible categories, alternatives 1a and 1b have by far the least number of acres.

It should be noted that there are no oversnow vehicles in Segments 1 and 14-16 in alternatives 1a and 1b. In those cases, the projected audibility is entirely due to autos, vans and buses, which do not change in any of the alternatives.

Table 85. Acres of Affected Park Land Where Vehicles Would Be Audible: Alternatives 1a and 1b.

Road Segment	Acres of affected Park land where vehicles would be audible					
	Average background conditions			Quiet background conditions		
	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more
Mammoth to Northeast Entrance	16,126	5,445	0	16,822	6,342	0
Mammoth to Norris	11,671	649	0	12,734	1,225	0
West Entrance to Madison	11,129	7,049	433	12,487	8,128	556
Madison to Norris	9,075	4,913	0	10,275	6,002	0
Norris to Canyon Village	5,740	1,031	0	6,637	2,518	0
Canyon Village to Fishing Bridge	10,883	4,433	0	12,233	5,521	0
Fishing Bridge to East Entrance	14,805	0	0	16,100	0	0

Road Segment	Acres of affected Park land where vehicles would be audible					
	Average background conditions			Quiet background conditions		
	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more
Fishing Bridge to West Thumb	17,671	10,032	0	20,423	12,495	0
Madison to Old Faithful	13,393	8,573	870	15,098	9,746	1,170
Old Faithful to West Thumb	10,207	4,822	0	11,549	5,918	0
West Thumb to Flagg Ranch	14,008	3,926	0	16,141	7,618	0
Grassy Lake Road	2,122	0	0	2,376	0	0
Flagg Ranch to Colter Bay	13,437	6,808	0	15,405	9,723	0
Colter Bay to Moran Junction	4,579	1,825	0	4,926	2,040	0
Moran Junction to east entrance	1,225	753	490	1,319	863	535
Moran Junction to south entrance	21,714	14,536	11,123	23,842	16,922	11,825
Teton Park Road	Closed	Closed	Closed	Closed	Closed	Closed
Moose-Wilson Road	659	0	0	695	0	0
Jackson Lake	Closed	Closed	Closed	Closed	Closed	Closed
TOTALS	178,445	74,795	12,916	199,062	95,060	14,087

Alternatives 1a and 1b feature no motorized vehicles of any type on Jackson Lake, Teton Park Road and the Antelope Flats snowmobile trail in GTNP. These alternatives also feature snowcoaches instead of snowmobiles in YNP, and allow snowcoaches from Colter Bay to Flagg Ranch along the Parkway. Wheeled traffic would be on the road from Colter Bay to Moran Junction, and from Moran Junction to the South and East Entrances of GTNP, along with a few cars on the Moose-Wilson Road.

The results for alternatives 1a and 1b show that for the average background sound level condition, wheeled or oversnow vehicles would be audible to some degree for just over 178,000 acres in the three park units. For over 74,000 of those acres, wheeled or oversnow vehicles would be audible for at least 10% of the daytime hours (8 a.m. to 6 p.m.) for the average background condition. For nearly 13,000 of those acres, they would be audible for at least half (50%) of the daytime hours for the average background condition. For the Quiet background conditions, these acreage totals would increase by 12%, 27% and 9% for the three audibility cases, respectively, compared to the Average condition.

The segment from Moran Junction to the South Entrance of GTNP would contribute the greatest amount to the total acreage values for all three audibility categories and both

background conditions. This segment, along with the segment from Moran Junction to the East Entrance of GTNP, would carry a great deal of “through” wheeled vehicle traffic unrelated to the Winter Use Plan alternatives. In the case of the “audible for 50% of the time or more” category, these two segments represent nearly 90% of the affected acreage for these alternatives. For the “audible for 10% of the time or more” category, these two segments represent nearly 20% of the affected acreage. For “audible at all,” they represent 12% of the affected acreage.

The plowed road from Mammoth to the YNP Northeast Entrance would be a major contributor to the “audible at all” acreage (and, to a lesser extent, “audible 10% or more”). The traffic volumes on this road and affected acreage would be the same for all four alternatives being analyzed.

The major contributors to the “audible at all” acreage for the over-snow segments would include Fishing Bridge-West Thumb, Fishing Bridge-East Entrance of Yellowstone, West Thumb-Flagg Ranch, Madison-Old Faithful, and Flagg Ranch-Colter Bay.

For the “audible 10% or more” categories, the major oversnow contributors would include Fishing Bridge-West Thumb, Madison-Old Faithful, West Entrance, Madison, and Flagg Ranch-Colter Bay. There would be zero acreage for the Fishing Bridge-East Entrance and Grassy Lake Road segments because of the low numbers of snowcoaches.

The only oversnow segments in the “audible 50% or more” categories would be from the West Entrance to Madison and from Madison to Old Faithful, caused by the large number of snowcoaches on these two segments.

Alternative 2: Effects by roadway segment

In alternative 2, while the number of total acres affected where vehicles would be audible at all is less than for alternative 1b, the number of acres affected where vehicles would be heard 10% of the time or 50% of the time or more is much greater than for alternative 1b. This result is due the significantly greater number of vehicles present in alternative 2.

If the acres for the Moran Junction to south entrance segment were removed (because wheeled vehicles on this plowed road segment are not affected by the SEIS alternatives), total acreages shown for alternative 2 would change. The following table compares acres affected with and without wheeled vehicles.

Table 86. Comparison of total acres affected where vehicles would be audible in alternative 2, separating out wheeled vehicle impacts.

Impacts on Segments:	Acres of affected Park land where vehicles would be audible					
	Average background conditions			Quiet background conditions		
	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more
Including wheeled-vehicle impacts	165,711	110,490	43,996	182,544	124,773	53,087
Without wheeled-vehicle traffic	143,997	95,954	32,873	158,702	107,851	41,262

The most dramatic differences between alternative 2 and the other alternatives caused by removing the segment, are in the columns for 50% or more audibility, areas which could be considered to have the greatest impact. In those areas, alternative 2 has by far the greatest number of acres affected.

It should be noted that there are no oversnow vehicles in Segments 1 and 16 in alternative 2. In those cases, the projected audibility is entirely due to autos, vans and buses, which do not change in any of the alternatives.

Table 87. Acres of affected park land where vehicles would be audible: alternative 2.

Road Segment	Acres of affected Park land where vehicles would be audible					
	Average background conditions			Quiet background conditions		
	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more
Mammoth to Northeast Entrance	16,126	5,445	0	16,822	6,342	0
Mammoth to Norris	11,504	6,314	0	12,483	7,259	0
West Entrance to Madison	7,120	6,168	4,872	8,448	6,750	5,602
Madison to Norris	6,961	5,633	2,781	7,362	6,247	3,792
Norris to Canyon Village	5,497	4,218	0	5,748	4,657	1,573
Canyon Village to Fishing Bridge	10,186	7,386	1,874	11,310	8,213	2,160
Fishing bridge to East Entrance	13,573	10,423	1,523	14,774	11,584	1,823
Fishing Bridge to West Thumb	15,932	10,752	3,274	18,106	12,086	4,006

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Road Segment	Acres of affected Park land where vehicles would be audible					
	Average background conditions			Quiet background conditions		
	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more
Madison to Old Faithful	8,994	7,973	6,432	11,066	8,715	7,359
Old Faithful to West Thumb	7,816	6,117	1,855	8,177	6,750	3,113
West Thumb to Flagg Ranch	13,632	11,485	8,882	15,439	12,706	10,240
Grassy Lake Road	3,346	1,059	0	3,582	1,497	0
Flagg Ranch to Colter Bay	9,156	5,870	0	9,884	6,795	0
Colter Bay to Moran Junction	5,306	3,659	778	5,721	4,179	897
Moran Junction to East Entrance	1,392	1,020	602	1,560	1,146	695
Moran Junction to South Entrance	21,714	14,536	11,123	23,842	16,922	11,825
Teton Park Road	Closed	Closed	Closed	Closed	Closed	Closed
Moose-Wilson Road	659	0	0	695	0	0
Antelope Flats snowmobile route	Closed	Closed	Closed	Closed	Closed	Closed
Jackson Lake	6,798	2,433	0	7,525	2,921	0
TOTALS	165,711	110,490	43,996	182,544	124,773	53,087

Alternative 2 features no motorized vehicles of any type on Teton Park Road and the Antelope Flats snowmobile trail in GTNP. Snowmobiles would be allowed, however, on Jackson Lake. For alternative 2, large numbers of snowmobiles would replace most or all of the comparatively fewer snowcoaches in alternatives 1a and 1b for all of the oversnow segments (all of the snowcoaches would be replaced between Fishing Bridge and the East Entrance of YNP, along Grassy Lake Road, and from Flagg Ranch to Colter Bay). Snowmobiles would be allowed in addition to wheeled vehicles between Colter Bay and Moran Junction, and from Moran Junction to the South and East Entrances of GTNP. The wheeled traffic volumes road from Colter Bay to Moran Junction, from Moran Junction to the South and East Entrances of GTNP, and on the Moose-Wilson Road would remain the same as for alternatives 1a and 1b.

For the average background sound level condition, wheeled or oversnow vehicles would be audible to some degree for just over 165,000 acres in the three park units, or about 7% less

than in alternatives 1a or 1b. Hidden within that percentage are decreases of 23%-36% on five segments: West Entrance to Madison, Madison to Old Faithful, Flagg Ranch to Colter Bay, Madison to Norris, and Old Faithful to West Thumb. Also hidden within that percentage are increases of just over 50% for Grassy Lake Road and from zero acres to around 7,000 acres for Jackson Lake.

For the average background condition, wheeled or over-snow vehicles would be audible for at least 10% of the daytime hours for just over 110,000 acres, or 48% more than in alternatives 1a or 1b. Vehicles would be audible for at least 50% of the daytime hours for the average background condition for 44,000 acres, or nearly 3.5 times as much as alternatives 1a or 1b.

For the quiet background conditions, the alternative 2 acreage totals would increase by 10%, 13%, and 21% for the three audibility cases, respectively, compared to the average condition for alternative 2. Compared to alternatives 1a and 1b, the quiet background “audible at all” acreage would be reduced 8%. The “audible for 10% of the time or more” acreage would increase by 31% for the quiet background, and the “audible for 50% of the time or more” acreage would increase by 377%.

As with alternatives 1a or 1b, the segment from Moran Junction to the South Entrance of GTNP would contribute the greatest amount to the total acreage values for all three audibility categories and both background conditions. This segment along with the segment from Moran Junction to the East Entrance of GTNP would carry a great deal of “through” wheeled vehicle traffic unrelated to the alternatives. The traffic volumes and affected acreage for these segments would be the same as for alternatives 1a or 1b.

However, in the case of the “audible for 50% of the time or more” category, these two segments would represent only about a quarter of the affected acreage for alternative 1b, compared to nearly 90% for alternatives 1a or 1b. The reason for the large difference is the fact that in alternative 2, many of the oversnow segments would now have acreage in this category due to the presence of the large number of snowmobiles. For the “audible for 10% of the time or more” category, these two Moran Junction segments would represent about 14% of the affected acreage (compared to nearly 20% for Alternatives 1 or 2). For “audible at all,” they would also represent 14% of the affected acreage (compared to 12% for alternatives 1a or 1b).

As with alternatives 1a or 1b, the plowed road from Mammoth to the Yellowstone Northeast Entrance would be a major contributor to the “audible at all” acreage (and, to a lesser extent, “audible 10% or more”) for alternative 2.

The major contributors to the “audible at all” acreage for the oversnow segments would include Fishing Bridge-West Thumb, Fishing Bridge-East Entrance of Yellowstone, West Thumb-Flagg Ranch, Mammoth-Norris, and Canyon Village-Fishing Bridge.

For the “audible 10% or more” categories, the major oversnow contributors would include West Thumb-Flagg Ranch (a relatively minor contributor for alternatives 1a or 1b), Fishing Bridge-West Thumb, and Fishing Bridge-East Entrance of Yellowstone. The latter would have zero acreage for alternatives 1a or 1b (as would Grassy Lake Road, which would have over 1,000 acres for alternative 2, and Jackson Lake, which would have over 2,000 acres for alternative 1b). Other segments with major increases in acreage in the “audible 10% or more” category would include: Mammoth to Norris (873% increase for average background, 493% for quiet background), Norris to Canyon Village (309% increase for average, 85% for quiet) and Colter Bay to Moran Junction (100% increase for average, 105% for quiet). Segments with decreases in affected acreage compared to alternatives 1a or 1b would include: West Entrance to Madison, Madison to Old Faithful, and Flagg Ranch to Colter Bay.

For the “audible 50% or more” categories, nearly all of the oversnow segments that would have zero acreage for alternatives 1a or 1b would have affected acreage for alternative 2. The exceptions would be Mammoth to Norris, Grassy Lake Road, Flagg Ranch to Colter Bay, and Jackson Lake, which would all still have zero acreage in this category. The major over-snow contributors for this category would be West Thumb to Flagg Ranch, Madison to Old Faithful, and YNP’s West Entrance to Madison.

Alternative 3: Effects by roadway segment

Alternative 3 has the lowest number of total acres affected where vehicles would be audible at all. However, the number of acres affected where vehicles would be heard 10% of the time or 50% of the time or more is much greater than for alternatives 1a or 1b. This result is due to the significantly greater number of vehicles present. Alternative 3 has fewer acres affected than alternative 2 due to the somewhat lower total volume of vehicles.

If the acres for the Moran Junction to south entrance segment were removed (because wheeled vehicles on this plowed road segment are not affected by the SEIS alternatives),

total acreages shown for alternative 2 would change. The following table compares acres affected with and without wheeled vehicles.

Table 88. Comparison of total acres affected where vehicles would be audible in alternative 3, separating out wheeled vehicle impacts.

Impacts on Segments:	Acres of affected Park land where vehicles would be audible					
	Average background conditions			Quiet background conditions		
	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more
Including wheeled-vehicle impacts	160,758	102,033	30,070	175,705	115,034	36,265
Without wheeled-vehicle traffic	139,044	87,497	18,947	151,863	98,112	24,440

The most dramatic differences between alternative 3 and the other alternatives from removing the segment are in the columns for 50% or more audibility, areas that could be considered to have the greatest impact. Alternative 3 has fewer acres than alternative 2 in those columns, but still far more than alternatives 1a and 1b.

It should be noted that there are no oversnow vehicles in Segments 1 and 16 in alternative 3. In those cases, the projected audibility is entirely due to autos, vans and buses, and does not change in any of the alternatives.

Table 89. Acres of Affected Park Land Where Vehicles Would Be Audible: Alternative 3.

Road Segment	Acres of affected Park land where vehicles would be audible					
	Average background conditions			Quiet background conditions		
	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more
Mammoth to Northeast Entrance	16,126	5,445	0	16,822	6,342	0
Mammoth to Norris	11,504	6,314	0	12,483	7,259	0
West Entrance to Madison	9,292	6,476	3,352	10,603	7,035	4,350

CHAPTER IV
ENVIRONMENTAL CONSEQUENCES

Road Segment	Acres of affected Park land where vehicles would be audible					
	Average background conditions			Quiet background conditions		
	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more
Madison to Norris	7,256	5,565	1,512	8,257	6,199	2,662
Norris to Canyon Village	5,453	4,030	0	5,695	4,450	0
Canyon Village to Fishing Bridge	10,052	6,326	665	11,159	7,181	1,135
Fishing Bridge to East Entrance	12,341	8,013	0	13,205	9,006	0
Fishing Bridge to West Thumb	15,770	8,983	0	17,952	10,386	0
Madison to Old Faithful	11,436	8,279	6,404	13,137	9,148	7,328
Old Faithful to West Thumb	7,769	5,828	0	8,116	6,430	0
West Thumb to Flagg Ranch	13,189	10,644	5,995	14,176	11,897	7,760
Grassy Lake Road	3,508	2,231	0	3,745	2,472	0
Flagg Ranch to Colter Bay	8,478	5,239	0	9,115	5,680	0
Colter Bay to Moran Junction	4,957	3,209	474	5,348	3,588	600
Moran Junction to East Entrance	1,254	916	545	1,355	1,038	605
Moran Junction to South Entrance	21,714	14,536	11,123	23,842	16,922	11,825

Road Segment	Acres of affected Park land where vehicles would be audible					
	Average background conditions			Quiet background conditions		
	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more	Audible at all	Audible 10% of the time or more	Audible 50% of the time or more
Teton Park Road	Closed	Closed	Closed	Closed	Closed	Closed
Moose-Wilson Road	659	0	0	695	0	0
Jackson Lake	Closed	Closed	Closed	Closed	Closed	Closed
TOTALS	160,758	102,033	30,070	175,705	115,034	36,265

Alternative 3 features no motorized vehicles of any type on Jackson Lake, Teton Park Road and the Antelope Flats snowmobile trail in GTNP. Alternative 3 assumes no Bombardier snowcoaches (only Mattracks), and fewer numbers of snowmobiles than alternative 2 on many of the oversnow segments. There is also a much greater number of snowcoaches from the West entrance to Madison, and from Madison to Old Faithful, compared to alternative 2, although the number is much less than for alternatives 1a or 1b. As with alternative 2, snowmobiles would be allowed in addition to wheeled vehicles between Colter Bay and Moran Junction, and from Moran Junction to the South and East Entrances of GTNP. The wheeled traffic volumes from Colter Bay to Moran Junction, from Moran Junction to the South and East Entrances of GTNP, and on the Moose-Wilson Road would remain the same as for the other alternatives.

For the average background sound level condition, wheeled or over-snow vehicles would be audible to some degree for just over 160,000 acres in the three park units, or about 10% less than in alternatives 1a and 1b. Hidden within that percentage are decreases of 15-41% on five segments: West Entrance to Madison, Madison to Old Faithful, Flagg Ranch to Colter Bay, Madison to Norris, and Old Faithful to West Thumb. Also hidden within that percentage is an increase of approximately 60% for Grassy Lake Road. For the average background condition, wheeled or over-snow vehicles would be audible for at least 10% of the daytime hours for just over 102,000 acres, or 36% more than in alternatives 1a and 1b. Vehicles would be audible for at least 50% of the daytime hours for the average background condition for 30,000 acres, or just under 2.5 times as much as in alternatives 1a and 1b.

For the quiet background conditions, the alternative 3 acreage totals would increase by 9%, 13% and 21% for the three audibility cases, respectively, compared to the average condition

for alternative 3. Compared to alternatives 1a or 1b, the quiet background “audible at all” acreage would be reduced 12%. The “audible for 10% of the time or more” acreage would increase by 21% for the quiet background, and the “audible for 50% of the time or more” acreage would increase by 257%.

As with the other alternatives, the segment from Moran Junction to the South Entrance of GTNP would contribute the greatest amount to the total acreage values for all three audibility categories and both background conditions. This segment along with the segment from Moran Junction to the East Entrance of GTNP would carry a great deal of “through” wheeled vehicle traffic unrelated to the alternatives. The traffic volumes and affected acreage for these segments would be the same as for the other alternatives.

However, in the case of the “audible for 50% of the time or more” category, these two segments would represent just over a third of the affected acreage for alternative 3, compared to nearly 90% for alternatives 1a and 1b. As with alternative 2, the reason for the large difference is the fact that in alternative 3, many of the oversnow segments would now have acreage in this category due to the presence of the large number of snowmobiles. For the “audible for 10% of the time or more” category, these two Moran Junction segments would represent 15%-16% of the affected acreage (compared to nearly 20% for alternatives 1a or 1b). For “audible at all,” they would also represent 14% of the affected acreage (compared to 12% for alternatives 1a or 1b).

As with all other alternatives, the plowed road from Mammoth to YNP’s Northeast Entrance would be a major contributor to the “audible at all” acreage (and, to a lesser extent, “audible 10% or more”) for alternative 3.

The major contributors to the “audible at all” acreage for the oversnow segments in alternative 3 would include Fishing Bridge-West Thumb, Fishing Bridge-East Entrance of YNP, West Thumb-Flagg Ranch, Mammoth-Norris, and Madison-Old Faithful.

For the “audible 10% or more” categories, the major oversnow contributors would include West Thumb-Flagg Ranch (a relatively minor contributor for alternatives 1a and 1b), Fishing Bridge-West Thumb, Madison-Old Faithful, and Fishing Bridge-East Entrance of YNP. The latter would have zero acreage for alternatives 1a and 1b (as would Grassy Lake Road, which would have over 2,000 acres for alternative 3). Other segments with major increases in acreage in the “audible 10% or more” category compared to alternatives 1a and 1b would include: Mammoth to Norris (873% increase for average background, 493% for quiet

background), Norris to Canyon Village (291% increase for average, 77% for quiet), West Thumb to Flagg Ranch (171% increase for average, 56% for quiet), and Colter Bay to Moran Junction (76% increase for both average and quiet). Segments with decreases in affected acreage compared to alternatives 1a and 1b would include: YNP's West Entrance-Madison, Madison to Old Faithful, Fishing Bridge to West Thumb and Flagg Ranch to Colter Bay.

For the “audible 50% or more” categories, several of the oversnow segments that would have zero acreage in alternatives 1a or 1b would have affected acreage for alternative 3. As with alternative 2, the major ones would be West Thumb to Flagg Ranch, Madison to Old Faithful, and YNP's West Entrance-Madison.

Average Sound Levels

To permit an evaluation of the average magnitude of the noise from wheeled and oversnow vehicle traffic, the modeling effort included computations of the hourly equivalent or “average” sound level (L_{eq}) over the day. Levels are shown for the three alternatives in Tables 90 through 92 for each road segment at two distances, 100 ft and 4000 ft, and for both open and forested terrain.

These hourly L_{eq} values do not have the background sound level added into them. Also, they cannot be compared against the background levels to assess audibility, since L_{eq} represents a long term average of both quiet and loud moments.

L_{eq} is an energy-based metric, therefore, if only a single snowmobile with a maximum level of 70 dBA passed by a site 100 feet from a trail during in an entire hour, the L_{eq} for that hour at that site would be approximately 40-45 dBA. If ten 70-dBA snowmobiles passed by instead of one, the L_{eq} would be 10 decibels higher, about 50-55 dBA.

Table 90 shows that the hourly L_{eq} at 100 feet are highest for the West Entrance-Madison and Madison-Old Faithful segments. Overall, the L_{eq} values are significantly lower for alternatives 1a and 1b (5 to 10 dB) at 100 ft as compared to alternatives 2 and 3 for the YNP road segments where the snowmobiles would be replaced with snowcoaches. At 4,000 feet away, the L_{eq} values are also highest for the West Entrance-Madison and Madison-Old Faithful segments, as well as the segments from Moran Junction to both the East Entrance and the South Entrance of GTNP.

Table 90. Average Hourly L_{eq} from Vehicular Noise at Two Distances from Each Road Segment: Alternatives 1a and 1b.

Road segment	Leq at distance (dBA)			
	Open terrain		Forested terrain	
	100 ft	4000 ft	100 ft	4000 ft
Mammoth to Northeast Entrance	35	2	33	0
Mammoth to Norris	42	6	40	0
West Entrance to Madison	49	15	47	7
Madison to Norris	46	12	44	4
Norris to Canyon Village	44	10	43	2
Canyon Village to Fishing Bridge	43	9	42	1
Fishing Bridge to East Entrance	36	2	35	0
Fishing Bridge to West Thumb	43	9	41	1
Madison to Old Faithful	49	15	47	7
Old Faithful to West Thumb	45	11	43	3
West Thumb to Flagg Ranch	44	10	42	2
Grassy Lake Road	42	2	41	0
Flagg Ranch to Colter Bay	44	10	42	2
Colter Bay to Moran Junction	40	7	38	0
Moran Junction to East Entrance	47	13	45	5
Moran Junction to South Entrance	46	14	44	6
Teton Park Road	No Vehicles	No Vehicles	No Vehicles	No Vehicles
Moose-Wilson Road	24	0	22	0
Jackson Lake	No Vehicles	No Vehicles	No Vehicles	No Vehicles

Table 91 shows that the hourly L_{eq} values at 100 feet are highest for the West Entrance-Madison, Madison-Old Faithful and West Thumb-Flagg Ranch segments. Average sound levels at 100 ft are 5 to 10 dB higher in alternative 2 than in alternatives 1a and 1b. This result is due to the presence of a greater number of total vehicles, including snowmobiles.

Table 91. Average Hourly L_{eq} from Vehicular Noise at Two Distances from Each Road Segment: Alternative 2.

Road segment	Leq at distance (dBA)			
	Open terrain		Forested terrain	
	100 ft	4000 ft	100 ft	4000 ft
Mammoth to Northeast Entrance	35	2	33	0
Mammoth to Norris	48	9	47	1
West Entrance to Madison	55	16	53	8
Madison to Norris	54	14	52	6
Norris to Canyon Village	53	13	51	5
Canyon Village to Fishing Bridge	52	12	50	4
Fishing Bridge to East Entrance	52	11	50	3
Fishing Bridge to West Thumb	51	11	50	3
Madison to Old Faithful	56	16	54	8
Old Faithful to West Thumb	53	13	52	5
West Thumb to Flagg Ranch	55	15	53	7
Grassy Lake Road	46	5	44	0
Flagg Ranch to Colter Bay	50	10	48	2

Road segment	Leq at distance (dBA)			
	Open terrain		Forested terrain	
	100 ft	4000 ft	100 ft	4000 ft
Colter Bay to Moran Junction	50	11	48	3
Moran Junction to East Entrance	51	14	49	6
Moran Junction to South Entrance	46	13	44	5
Teton Park Road	No Vehicles	No Vehicles	No Vehicles	No Vehicles
Moose-Wilson Road	24	0	22	0
Jackson Lake	46	4	44	0

Table 92 shows that the hourly L_{eq} values at 100 feet are highest for the West Entrance-Madison, Madison-Old Faithful and West Thumb-Flagg Ranch segments. Average sound levels at 100 ft are 5 to 10 dB higher in alternative 3 than in Alternatives 1a and 1b. This result is due to the presence of a greater number of total vehicles, including snowmobiles. Levels in alternative 3 are slightly lower than those in alternative 2, because the number of total vehicles on most segments is reduced.

Table 92. Average Hourly L_{eq} from Vehicular Noise at Two Distances from Each Road Segment: Alternative 3.

Road segment	Leq at distance (dBA)			
	Open terrain		Forested terrain	
	100 ft	4000 ft	100 ft	4000 ft
Mammoth to Northeast Entrance	35	2	33	0
Mammoth to Norris	48	9	47	1
West Entrance to Madison	54	16	52	8
Madison to Norris	53	13	51	5
Norris to Canyon Village	52	12	50	4
Canyon Village to Fishing Bridge	51	11	49	3
Fishing Bridge to East Entrance	49	8	47	0
Fishing Bridge to West Thumb	50	10	48	2
Madison to Old Faithful	55	17	54	9
Old Faithful to West Thumb	52	12	50	4
West Thumb to Flagg Ranch	54	14	53	6
Grassy Lake Road	49	8	47	0
Flagg Ranch to Colter Bay	49	8	47	0
Colter Bay to Moran Junction	48	11	47	3
Moran Junction to East Entrance	49	13	48	5
Moran Junction to South Entrance	46	13	44	5
Teton Park Road	No Vehicles	No Vehicles	No Vehicles	No Vehicles
Moose-Wilson Road	24	0	22	0
Jackson Lake	No Vehicles	No Vehicles	No Vehicles	No Vehicles

Definition of Impact Levels for Noise

Impacts on the natural soundscape are complex, as with many other resources and values. Complexity is a blend of the geographic source, frequency and magnitude of man-made

sound. The natural soundscape is an intrinsic resource or value of park lands, and includes all of the sounds of nature absent any sounds from human sources. Audibility (i.e., whether a sound can be heard at all within the natural soundscape), sound level (i.e., amount of sound energy or "loudness" of the sound), and time factors (i.e., duration, frequency of occurrence, and timing) of noise is interpreted as an impact on the natural soundscape. The definition of impact levels takes these factors into account. How the listener is affected qualitatively by noise is a relative concept not dealt with here, but rather under visitor experience.

Table 92. Definition of impacts to the natural soundscape

Impact Category	Definition
No Effect	An action that does not affect the natural soundscape or the potential for its enjoyment, and unique soundscape characteristics are not present.
Adverse Negligible Effect	An action that may affect the natural soundscape or potential for its enjoyment, but with infrequent occurrence and only for short duration at low sound levels. At this impact level, unique soundscape characteristics (such as bubbling hot springs or geysers) are not affected.
Adverse Minor Effect	An action that may affect the natural soundscape or potential for its enjoyment in zones of use where man-made sounds are expected. In those zones, duration, frequency of occurrence, and level are all considered no more than minor. However, noise is rarely audible more than 50% of the time in these zones, and levels are rarely 50 dBA or greater at 100 feet or 10 dBA or greater at 4000 feet. Relatively few acres are affected in management zones where noise is not expected to be audible, and in those zones effects are infrequent with short duration and at low levels.
Adverse Moderate Effect	An action that may affect the natural soundscape or potential for its enjoyment in zones of use where man-made sounds are expected. In those zones, at least one of duration, frequency of occurrence, or level is considered moderate, but none are considered major. However, noise is audible 50% or more of the time in a minority of the area of these zones, and/or levels are often 50 dBA or greater at 100 feet or 10 dBA or greater at 4000 feet. A relatively disproportionate area is affected in management zones where noise is not expected to be audible, and/or in those zones effects are more than infrequent or of more than short duration or low level.
Adverse Major Effect	An action with an easily recognizable adverse effect on the natural soundscape or potential for its enjoyment. In zones where man-made sounds are expected, it is a major effect if any of the duration/frequency/levels are considered major, or if audibility is 50% or more of the time in half of these zones. A relatively disproportionate area is affected by noise in management zones where noise is not expected to be audible, or where any of duration/frequency/level in those zones is considered moderate or greater.

Conclusions

For perspective in a summary comparison of alternatives, the following information should be considered. A single snowmobile of a type evaluated in this SEIS (i.e., quietest available),

traveling at normal speed, is audible to a distance of 3,720 feet in open terrain with a quiet natural background. This is about one-third greater than the audibility distance affected by a single gas-powered "Mattrack" van snowcoach, which is audible to 2,200 feet under the same conditions. Because a snowcoach of this type would carry 4 to 6 times more visitors, visitation levels overall can be directly enhanced by a factor of 4 to 6 while reducing audibility distances by a third if snowmobiles were replaced by gasoline Mattracks one-for-one. In forested terrain, with a quiet background, the reduction is closer to one half than one third (2,030 to 1,210 feet). Presented another way, in a quiet background, a group of 8 to 12 snowmobiles is audible from 9,210 to 11,150 feet in open terrain, compared to a gas Mattrack carrying the equivalent number of people being audible to 2,200 feet. This replacement would reduce the audibility distance by a factor of 4 to 5 times. These mixes and tradeoffs are evident in the effects of the range of alternatives evaluated in this SEIS (see Chapter IV, Table 78 for information on the comparisons in this paragraph).

Table 93 presents a summary of the total acres of affected parkland for each project alternative. In the "audible at all" category, alternatives 1a and 1b affect the greatest acreage. This result is due the presence of the Bombardier snowcoach in the alternative 1a and 1b vehicle mix; that vehicle produces a low-frequency tone that can be heard for long distances. It should be noted that in these alternatives, only Bombardiers that can meet a 70dB sound level standard would be allowed. In the other two categories where audible percentages are shown, alternatives 1a and 1b affect significantly less acreage than either alternative 2 or 3. This result is due to the substantially reduced total number of vehicles present on park roadways.

Table 93. Acres of Affected Park Land, including impacts of wheeled vehicles.

Audibility metric	Background condition	Acres of affected park land, by project alternative		
		1a and 1b	2	3
Audible at all	Average	178,445	165,711	160,758
	Quiet	199,062	182,544	175,705
Audible 10% of the time or more	Average	74,795	110,490	102,033
	Quiet	95,060	124,773	115,034
Audible 50% of the time or more	Average	12,916	43,996	30,070
	Quiet	14,087	53,087	36,265

Again, as explained above, some of the acreage in Table 93 is due to wheeled vehicles on plowed roads which do not change in any of the SEIS alternatives. If the wheeled vehicles are removed, the acreages decrease, most dramatically in the 50% or more category where

the greatest impacts occur. This more accurately represents the effects of the alternatives being considered. The acreage on which sound is audible more than 50% of the time is 18 times greater in alternative 2 than in alternatives 1a and 1b, and almost 11 times greater in alternative 3.

Table 94. Acres of affected park land, considering only oversnow vehicles.

Audibility metric	Background condition	Acres of affected park land, by project alternative		
		1 and 2	3	4
Audible at all	Average	156,731	143,997	139,044
	Quiet	175,220	158,702	151,863
Audible 10% of the time or more	Average	60,259	95,954	87,497
	Quiet	78,138	107,851	98,112
Audible 50% of the time or more	Average	1,793	32,873	18,947
	Quiet	2,262	41,262	24,440

In alternatives 1a and 1b, the average hourly sound levels at 100 feet from the travelway are highest for the West Entrance-Madison and Madison-Old Faithful segments. Overall, the average sound levels are significantly lower for alternatives 1a and 1b (5 to 10 dB) at 100 ft as compared to alternatives 2 and 3 for the YNP road segments where the snowmobiles would be replaced with snowcoaches. At 4,000 feet away, the average sound level values are also highest for the West Entrance-Madison and Madison-Old Faithful segments, as well as the segments from Moran Junction to both the East Entrance and the South Entrance of GTNP.

For alternative 2, the average hourly sound levels at 100 feet from the travelway are highest for the West Entrance-Madison, Madison-Old Faithful, and West Thumb-Flagg Ranch segments. Average sound levels at 100 ft are 5 to 10 dB higher in alternative 2 than in alternatives 1a and 1b. This result is due to the presence of a greater number of total vehicles, including snowmobiles.

For alternative 3, the average hourly sound levels at 100 feet from the travelway are highest for the West Entrance-Madison, Madison-Old Faithful and West Thumb-Flagg Ranch segments. Average sound levels at 100 ft are 5 to 10 dB higher in alternative 3 than in alternatives 1a or 1b. This result is due to the presence of a greater number of total vehicles, including snowmobiles. Levels in alternative 3 are slightly lower than those in alternative 2, because the number of total vehicles on most segments is reduced.

Considering park-wide impacts, all alternatives affect substantial acres outside the travel corridors in terms of where noise is audible at all. Therefore, all alternatives have the

potential for adverse and moderate impacts. In reviewing the acres by alternative in which noise is audible 10% or more of the time, all alternatives have a disproportionate number of backcountry⁸ or nonmotorized zone acres affected by sound generated in the travelways. However, acres affected in alternatives 2 and 3 are substantially higher than in alternatives 1a and 1b. The numbers of road segments (and associated areas) in which it could be stated there are adverse moderate impacts on sound are higher in alternatives 2 and 3. In alternatives 1a and 1b, the number of acres where noise is audible greater than 50% of the time is less than the number of acres located in zones where noise is produced (about 10,000 acres for all three park units)⁹. Alternative 2 exceeds this amount by 3 to 4 times the number of acres, and alternative 3 exceeds them by about 2 to 2.5 times as many. By this measure, alternatives 1a and 1b have the least impact on areas in which no noise is expected, thereby affecting the natural soundscape the least by a substantial margin. Alternatives 1a and 1b would have adverse minor impacts, particularly if aging and loud snowcoaches were to be replaced by quieter vehicles.

Alternative 2 would have the potential for moderate adverse impacts on the greatest number of road segments or areas, and potential for major adverse impacts on some segments and in nonmotorized zones where noise is not expected to be audible, loud or frequent. Alternative 3 would have fewer segments and zones affected at this level, while eliminating a moderate adverse impact in the area of Jackson Lake.

THE EFFECTS OF IMPLEMENTING THE ALTERNATIVES ON VISITOR ACCESS AND CIRCULATION

Impacts of a range of alternatives on visitor access and circulation are disclosed in the FEIS. This analysis therefore tiers to the analysis presented in the FEIS. All alternatives in the FEIS provide for access at current levels of visitation, although the alternatives provided different mixes of use redistribution and mode of access. It is no different for the SEIS alternatives. Each alternative provides, as a minimum, for current levels of visitation. Alternatives 1a and 1b provide this visitation by use of snowcoaches throughout all areas that are currently accessible by oversnow motorized means in and to YNP. Alternative 2

⁸ “Backcountry” is a reference to portions of the park that are generally outside the travel corridors. In terms of the alternatives in this SEIS, backcountry is defined in the management zone tables as Zone 8.

⁹ This value is calculated to provide a context for the magnitude of impact associated with motorized oversnow transport, and the area over which the total sound impact is audible by alternative. It is calculated by adding the total length of oversnow route in this analysis (including routes that are co-located with wheeled vehicle traffic) times the width of the corridor, and converting the area to acres [218 mi x 5280 ft/mi x 300 ft x 1/43560 ac/ft² = approx 8000 ac]. Most corridors border recommended or proposed wilderness, defined as being 100 ft from either side of the road. The same convention is used to relate corridors to backcountry.

provides for access at or above current levels of visitation by snowmobiles, in addition to the present level of snowcoach use, in all areas presently available for oversnow motorized use. Alternative 3 provides for access in most park areas, at current use levels, by snowmobile. It also provides for additional use by snowcoach at or above current levels of visitation in all areas presently served by snowcoach. In the 3-park area, these alternatives have no impact on the opportunity for motorized access, or the areas in which people use motorized access to circulate and enjoy park resources and values. The mode of access is a function of visitor preference for a certain type of travel experience, unrelated to the intrinsic values of the parks. Therefore, the impacts of each alternative regarding changes in access mode are dealt with under visitor experience. Under NPS policies, visitor experience is more associated with the quality of resources and values in the park setting, and less associated with the mode of transport used to access them.

THE EFFECTS OF THE IMPLEMENTING THE ALTERNATIVES ON VISITOR EXPERIENCE

Methods and Assumptions

Analyses of impacts on the visitor experience are limited to alternative features that pertain to oversnow motorized access in the parks and groomed roads and trails for motorized use. The analysis is further limited to those key indicators of visitor experience for which new information and analysis may alter the assessment of impacts as disclosed in the FEIS and for which impacts may vary by alternative (see impact topics addressed in Chapter III). The analysis of impacts on visitor experience discussed in the FEIS remains valid: see Chapter IV, *Effects of Implementing the Alternatives on Visitor Experience*.

This assessment is based on visitor surveys of several different groups of respondents. The first group includes data from surveys of winter visitors to the parks. The second group includes surveys that examine the opinions of summer visitors and the local, regional and national populations at large concerning winter use management. The third set of surveys includes information from studies conducted by the states of Montana, Idaho and Wyoming, and Teton County, Wyoming. Two indicators of impact level were used in the analysis. First, the availability of the range of winter visitor opportunities was determined for each alternative. Second, the range of opportunities available under each alternative was compared with the satisfaction, importance and value that the various survey respondents place on that particular experience or opportunity. Where the opinions of different user groups diverge concerning a particular value, they are identified in the analysis.

Criteria that are used to gauge visitor satisfaction in each alternative are:

- Opportunities for viewing wildlife;
- Opportunities for viewing scenery;
- The quality of the groomed snow surface;
- Safety (the safe behavior of others);
- Access to winter activities and experience;
- Opportunities for quiet and solitude; and
- Clean air.

These indicators of visitor satisfaction were derived from eight primary sources: Littlejohn (1996); Friemund (1996); Borrie and Friemund (1997); Borrie et al. (1999); Davenport (1999); and Duffield et al. (2000a, 2000b, and 2000c) and the Wyoming Snowmobile Survey (2001). Other winter use surveys and assessments from Teton County, Wyoming, the states of Wyoming, Montana and Idaho, and the parks were used to validate the criteria. See Chapter III, *Visitor Experience*, for more detailed discussion of the survey data used in this analysis. Table 95 includes definitions for impacts to visitor experience.

Table 95. Definition of impacts to visitor experience.

Impact Category	Definition
Negligible	Little noticeable change in visitor experience.
Minor	Changes desired experiences but without appreciably limiting or enhancing critical characteristics of the experience.
Moderate	Changes critical characteristics of the desired experience or reduces or increases the number of participants.
Major	Eliminates, detracts from or greatly enhances multiple critical characteristics of the desired experience or greatly reduces or increases participation.
Neutral	An action that will create no change in the defined indicators of visitor satisfaction or quality of park experience.

Regulations and policies for management of visitor activities underlie the analysis determinations presented in the consequence discussions. Section 8.2 Visitor Use from the *National Park Service Management Policies 2001* provides specific direction.

8.2 Visitor Use

Enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks. The Service is committed to providing appropriate, high quality opportunities for visitors to enjoy the parks, and will maintain within the parks an atmosphere that is open, inviting, and

accessible to every segment of American society. However, many forms of recreation enjoyed by the public do not require a national park setting, and are more appropriate to other venues. The Service will therefore:

- Provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the superlative natural and cultural resources found in the parks.
- Defer to local, state, and other federal agencies; private industry; and non-governmental organizations to meet the broader spectrum of recreational needs and demands.
- To provide for enjoyment of the parks, the National Park Service will encourage visitor activities that:
 - Are appropriate to the purpose for which the park was established; and are inspirational, educational, or healthful, and otherwise appropriate to the park environment; and
 - Will foster an understanding of, and appreciation for, park resources and values, or will promote enjoyment through a direct association with, interaction with, or relation to park resources; and
- Can be sustained without causing unacceptable impacts to park resources or values.

The primary means by which the Service will actively foster and provide activities that meet these criteria will be through its interpretive and educational programs, which are described in detail in chapter 7. The Service will also welcome the efforts of private-sector organizations to provide structured activities that meet these criteria. In addition to structured activities, the Service will, to the extent practicable, afford visitors ample opportunity for inspiration, appreciation, and enjoyment through their own personalized experiences, without the formality of program or structure. The Service will allow other visitor uses that do not meet all the above criteria if they are appropriate to the purpose for which the park was established and they can be sustained without causing unacceptable impacts to park resources or values.

Unless mandated by statute, the Service will not allow visitors to conduct activities that:

- Would impair park resources or values;
- Create an unsafe or unhealthful environment for other visitors or employees;
- Are contrary to the purposes for which the park was established; or

Unreasonably interfere with:

- The atmosphere of peace and tranquility, or the natural soundscape maintained in wilderness and natural, historic, or commemorative locations within the park;
- NPS interpretive, visitor service, administrative, or other activities;
- NPS concessioner or contractor operations or services; or
- Other existing, appropriate park uses.

The Effects on Visitor Experience Common to All Alternatives

Visitors who have physical disabilities would have improved access under all alternatives as winter access action plans are implemented and barriers to facilities and programs are removed. All facilities, such as warming huts, mass transit or snowmobile staging areas and restrooms, proposed for construction or reconstruction, would comply with all federal and NPS accessibility requirements.

The Effects of Implementing Alternative 1a on Visitor Experience in YNP

The amount and type of winter visitor opportunities offered in the parks under alternative 1a, no action, are provided in Table 95.

Table 95. YNP visitor opportunities available under alternatives 1a and 1b.

Opportunity	Miles or Areas	Length of Season	Other
Oversnow motorized route — snowcoach	184	Mid-December to Mid-March	Late night closure 9 PM to 8 AM
Oversnow motorized trail	0	Mid-December to Mid-March	Late night closure 9 PM to 8 AM
Plowed route	76	Mid-December to Mid-March	

Visitor Satisfaction and Experience in YNP

Opportunities to view wildlife. Most winter visitors rate wildlife viewing as a primary or important reason for visiting the parks. Most visitors are generally satisfied with the amount of wildlife viewing opportunities currently available. One of the top three reasons for visiting YNP cited by Borrie et al. (1999) was to view bison.

Opportunities to view wildlife would not decrease under this alternative because all oversnow routes would remain open and no limits on visitor access would be implemented. Because snowcoach travelers are free to watch for wildlife, the quality and quantity of viewing opportunities may increase for these visitors. However, because visitors riding on snowcoaches travel in groups, wildlife viewing would rarely be a solitary or an individualized experience and visitors would not experience the personal freedom to stop and view wildlife at will.¹⁰

Opportunities to view scenery. Most winter visitors to YNP and GTNP (Littlejohn 1996; Borrie et al. 1999) rate viewing scenery as a primary reason for their visit. Recent visitors to YNP indicated that they were for the most part “totally” satisfied with the quality of scenery in the parks.

Opportunities to view scenery would not decrease under this alternative because all oversnow routes would remain open and no limits on visitor access would be implemented. However, the nature of the viewing experience for motorized access would change substantially. Visitors who find the personal freedom to stop and view scenery, at will, essential to their park experience would be adversely affected by this alternative (see below discussion on the *Availability of Access to Winter Activities*).

¹⁰ It is important to note that impromptu stops by snowcoaches to view scenery and wildlife are frequent occurrences under current operations and there is no reason to assume that this situation would change.

Safety (the safe behavior of others). Snowmobile riders and skiers rate this factor as important and indicate that it has an influence on the enjoyment of their visit. Many visitors indicate that the dual use of trails and areas for both snowmobiling and skiing contributes to the perception of an unsafe environment.

Snowcoach-only travel would eliminate the risk of snowmobile accidents and snowmobile/skier conflicts. The general decrease in vehicle miles traveled would necessarily reduce the likelihood of motorized vehicle accidents. In addition, there were no large mammals hit or killed by busses or snowcoaches in YNP from 1989 to 1998 (Gunther et al. 1998). Wildlife and snowmobile collisions often result in human injury. Alternative 1a would result in moderate to major beneficial improvements to visitor safety.

Quality of the groomed surface. More than 80% of winter visitors rate the quality of the groomed road surface as very important. The groomed surface from West Entrance to Old Faithful is frequently very rough and the quality of snow cover is poor.

Both positive and negative effects to the groomed surface would occur under this alternative. The larger tracks of snowcoaches would reduce the overall quality of the groomed surface. However, because the total number of vehicles would be reduced, an net improvement in groomed surface quality would be expected.

The availability of access to winter activities or experiences. Nearly all respondents to a recent survey (Borrie et al. 1999) supported oversnow mechanized access. More than 90% of winter visitors surveyed did not support plowed roads and snowcoach-only travel. Most winter visitors valued highly the winter experience in the parks and felt it was a special and unique experience. Winter respondents to the 1998-1999 winter visitor survey (Duffield et al. 2000a) also favored access to the parks by snowmobile. Respondents to the summer (Duffield et al. 2000b) and telephone surveys (Duffield et al. 2000c) were more evenly divided between support for groomed roads for snowmobiles and support for groomed access for snowcoaches. Plowed access also received very low support from the summer and telephone survey respondents. Similarly, in a count of public comments supporting various alternatives in the DEIS, there was an even split between numbers of letters supporting groomed access for snowmobiles (44%) and those supporting groomed access for snowcoaches only (45%). Comment letters on the FEIS were less evenly divided. Of the 10,880 letters received, 70% supported the elimination of snowmobiles from the parks.

Oversnow mechanized access would be maintained on all existing groomed routes. Snowcoaches generally travel at lower speeds (about 30 mph to 35 mph) than snowmobiles (40 mph to 45 mph). For visitors who travel from the South Entrance to Old Faithful the slower snowcoach travel time combined with the additional oversnow mileage from Colter Bay would require an additional one hour of travel time each way.

The removal of snowmobile access into the park would eliminate the current most popular form of winter experience (more than 60% of users) resulting in major adverse effects on snowmobile users.¹¹

The late night closure from 9 P.M. to 8 A.M. would result in minor adverse effects due primarily to visitor inconvenience.

Availability of information. Surveyed winter visitors indicate that the availability of safety information is very important. Accurate and readily available information about safe travel practices and winter conditions is one of the suggested management actions that received a high level of support from most respondents.

Additional visitor contact stations, warming huts and an aggressive information program would enhance visitor safety and understanding of the winter environment under this alternative.

Quiet and solitude. Most survey respondents felt that natural quiet and solitude was important to the quality of their park visit. A recent study indicates that respondents ranked experiencing tranquility, peace, quiet, and getting away from crowds as highly important (Borrie et al. 1999).

Under alternative 1a only snowcoaches that can meet strict sound standards would be allowed in the parks. Initially, reduction in sound emissions would be moderate. However, as bombardier snowcoaches, which produce higher sound levels, are retrofitted or phased out the opportunities to experience quiet would be greatly improved. Average noise levels would not exceed 50 dB at 100' on any road segment. Average noise levels would exceed 10 dB over 4000' on approximately 7 road segments. This alternative would result in major beneficial effects over time, particularly for nonmotorized users of the parks. Because of the

¹¹ Recent survey data collected by Duffield et al. (2000a) indicates that about 33.4% of nonresident winter visitors would not return to YNP under snowcoach-only management. However, national and regional survey respondents indicated that they favored snowcoach-only access (Duffield et al. 2000c). Similarly, a review of public comment on the DEIS indicates an even split between those who favored snowmobile access and those who favored snowcoach only access. For park visitors who favored snowcoach only access, alternative 1a would have a positive effect.

mass transit requirements, options for solitude would be limited for visitors who cannot physically ski or hike.

Motor vehicles in this alternative would be audible over 14,090 acres for greater than 50% of the time. Travel corridors encompass approximately 10,000 acres (see *Effects of Implementing the Alternatives on the Natural Soundscape*). Vehicle noise would therefore result in moderate beneficial improvements in opportunities to experience quiet in the backcountry when compared to alternative A in the FEIS.

Clean Air. Clean air was important to most visitors (Littlejohn 1996). Surveyed visitors indicated a high level of support for management actions requiring clean and quiet snowmobiles (Duffield et al. 2000c; Borrie et al. 1999; Wyoming 2001). Through the permitting process the NPS would require that all snowcoaches meet the highest environmental standards possible for commercially produced mass transit oversnow vehicles. Currently this vehicle is the mat track conversion van. The reductions in vehicle emissions would provide major beneficial improvements in opportunities to experience clean air in YNP.

Conclusion

The reduction in emissions and sound under this alternative would result in direct major beneficial improvements to the experiences of park visitors. There would be a minor to moderate beneficial impact on visitor experience due to increased availability of information, interpretation, and winter programs. There would be no change relative to alternative A in opportunities to view wildlife and scenery. There would be major beneficial changes relating to safety by eliminating the possibility of snowmobile related motor vehicle accidents.

The elimination of snowmobiles would result in major adverse impacts to the experiences of visitors in this user group. Currently this represents 60% of all winter visitors to the park.

Under specific circumstances, the adaptive management provisions of this alternative may result in area closures. If monitoring or scientific studies regarding winter visitor use, natural resources, and other park values indicate that sections of the park must be closed or certain uses restricted to protect park values (for example, snowmobiling or backcountry skiing), some or all visitor experiences in the closure area would be eliminated. These areas of closure would result in localized direct adverse impacts to desired winter visitor

experience. However, the long term protection of these resources would provide major benefits to the protection of desired visitor experiences park-wide.

The Effects of Implementing Alternative 1a on Visitor Experience in Grand Teton and the Parkway

The amount and type of winter visitor opportunities offered in the parks under the no action alternative are provided in Table 96.

Table 96. GTNP and the Parkway visitor opportunities available under alternatives 1a and 1b.

Opportunities	Miles or Areas	Length of Season	Other
Groomed motorized route	0	December to April [†]	Late night closure 9 PM to 8 AM
Groomed motorized route, snowcoach	29	December to April [†]	Late night closure 9 PM to 8 AM
Groomed motorized trail	0	December to April [†]	Late night closure 9 PM to 8 AM
Plowed road	83.4	N/A	N/A
Ungroomed motorized trail or area	0	December to April [†]	Late night closure 9 PM to 8 AM

[†] Variable based on weather

Visitor Satisfaction and Experience in GTNP

Opportunities to view wildlife. Visitors on plowed roads, the CDST, and Jackson Lake would continue to enjoy wildlife and scenery viewing. Viewing opportunities would be eliminated for riders of snowmobiles on Jackson Lake and the CDST. This would result in major adverse effects on the experiences of these visitors.

Opportunities to view scenery. With the elimination of snowmobile access, and no wheeled vehicle access north of Colter Bay, there would be fewer opportunities to view scenery by auto and snowmobile. Scenery would be viewed in this area from a snowcoach operating from Colter Bay north to YNP and Flagg Ranch west to Idaho.

Safety (the safe behavior of others). The CDST would be eliminated through GTNP and the Parkway, except for mass transit from Colter Bay to YNP and the west Parkway boundary. This would enhance safety for other nonmotorized uses on these routes.

Quality of the groomed surface. Oversnow motorized uses would be eliminated except for snowcoaches. Snowcoaches would operate on a groomed route from Colter Bay into YNP

and to the west Parkway boundary on Grassy Lake Road. Because of the overall reduction in the number of vehicles traveling these routes, minor to moderate improvements to the groomed surface would be expected under this alternative.

The availability of access to winter activities or experiences. Access to motorized winter experiences would be decreased except for snowcoaches operating from Colter Bay into YNP and to the west Parkway boundary. There would be a loss of ice fishing opportunities via snowmachine on Jackson Lake. The closure of Jackson Lake to snowmobiles would result in major adverse effects on visitors who cannot ski or snowshoe to fishing areas. The exclusion of motorized travel from the lake would also result in limited access to Webb Canyon and other backcountry areas. However, nonmotorized use on and in the vicinity of the lake would be enhanced. Under this alternative, skiing on the groomed surface of the roadway north of Moran Junction would also be available. These actions would particularly benefit local residents who indicated that skiing in the park was their favorite activity (Teton Co. 1998). However, because of the elimination of wheeled access to Flagg Ranch after 2008, visitors who wish to ski in areas between Moran Junction and Flagg Ranch may (depending on distance) require a snowcoach shuttle for transport. The closure of the CDST would result in major adverse effects on visitors (approximately 2,017 annually) who wish to snowmobile on this route.

Availability of information. There would be enhanced and increased visitor programs, facilities, and interpretive opportunities to better meet the expectation and need for information.

Quiet and solitude. With elimination of snowmobile and snowplane use, opportunities for quiet and solitude would be enhanced. The major benefit of this would accrue to nonmotorized uses. There would be a lost opportunity for snowmobilers who are seeking this experience.

Clean air. With elimination of snowmobile use, a major source of pollution would be eliminated. The opportunity to experience clean air would be greatly enhanced under this alternative.

Conclusion

Negligible to minor adverse impacts on visitor experience relating to wildlife and scenery viewing would occur because of the elimination of motorized travel on the frozen surface of Jackson Lake. Opportunities to view wildlife would be improved for nonmotorized users of

these areas. There would be major beneficial changes relating to safety by eliminating the possibility of snowmobile-related motor vehicle accidents, and wheeled vehicle accidents on the road segment from Colter Bay to Flagg Ranch. Improving groomed surfaces would be moderately beneficial for snowcoach use and occupant safety. Overall, there would be a major adverse impact on the availability of access for those who wish to ride snowmobiles or snowplanes. There would be a minor to moderate beneficial impact to visitor experience due to increased availability of information, interpretation, and winter programs. There would be a major beneficial impact relative to opportunities for quiet and solitude. Opportunities to appreciate clean air would be greatly improved. Where oversnow motorized use occurs, via snowcoach, quiet and clean air would be facilitated by improved motorized technology.

The adaptive management provisions of this alternative require that if monitoring or scientific studies regarding winter visitor use, natural resources and other park values indicate that sections of the park must be closed or certain uses (for example, snowmobiling or backcountry skiing) restricted to protect these values, some or all visitor experiences currently afforded in the area of closure would be eliminated. These areas of closure or reductions in use would result in direct and localized adverse impacts to desired winter visitor experience. However, the long term protection of these resources would provide major benefits to the protection of desired visitor experiences park-wide.

The Effects of Implementing Alternative 1b on Visitor Experience in YNP and Grand Teton and the Parkway

The effects of alternative 1b on visitor experience are the same as those indicated for alternative 1a with one exception. Because the full implementation of this alternative would be delayed until the winter of 2004-2005 the effects on visitor experience that are described for alternative A in the FEIS (pages 268-270) would continue until that time.

Effects of Implementing Alternative 2 on Visitor Experience in YNP

The amount and type of winter visitor opportunities offered in the parks under alternative 2 are provided in Table 97.

Table 97. YNP visitor opportunities available under alternative 2.

Opportunity	Miles or Areas	Length of Season	Other
Oversnow motorized route	184	Mid-November to Late-March	8 PM to 7:30 AM 8:30 AM from West Entrance
Oversnow motorized trail	0	Mid-November to Late-March	8 PM to 7:30 AM
Plowed route	76	N/A	N/A

Visitor Satisfaction and Experience in YNP

Opportunities to view wildlife. Upon full implementation of this alternative, the opportunity to view wildlife would not decrease because the all major oversnow routes would remain open to motorized travel. However, on high use days, wildlife viewing would rarely be a solitary experience.

Opportunities to view scenery. Opportunities to view scenery would not decrease under this alternative because all oversnow routes would remain open to motorized travel.

Safety (the safe behavior of others). Snowmobile riders and skiers rate this factor as important and indicate that it has an influence on the enjoyment of their visit. The effects on safety under this alternative would be similar to those described in alternative A of the FEIS with one exception. The decreased speed limit on the West Entrance road would result in improvements in safety for park visitors.

Quality of the groomed surface. More than 80% of winter visitors rate the quality of the road surface as very important. The groomed surface from West Entrance to Old Faithful is frequently very rough and the quality of snow cover is poor. Adaptive management provisions for this alternative indicate that for Zone 3 (groomed motorized routes) that groomed surfaces must remain no worse than "fair" for 35% of a 24 hour period (approximately 8.4 hours). If this standard is exceeded management actions include increased grooming and an adjustment of vehicle numbers when threshold temperature is reached.

The availability of access to winter activities or experiences. The ability to snowmobile into the park at current use levels would maintain the current most popular form of winter experience (more than 60% of users) resulting in major beneficial effects on those users. The adaptive management provisions of this alternative propose preliminary management actions that would be implemented if some resource or experience thresholds were exceeded.

Management actions for sound, smoothness of groomed surfaces, and visitor satisfaction include adjusting visitor numbers. If mitigation is unsuccessful, visitor numbers could be reduced (if successful numbers could be increased). These reductions would result in direct and localized adverse impacts to desired winter visitor experience. However, the long term protection of these resources would provide major benefits to the protection of desired visitor experiences park-wide.

Under alternative 2, use limits would be implemented beginning in 2002-2003. In the first year total snowmobile use in YNP would be limited to 1,700 per day. In the second year, snowmobile use would be limited to 1,500 per day and in year three forward, use would be limited to 1,300 snowmobiles. Although these use limits would accommodate most visitors who wish to snowmobile, on some peak demand days, some visitors may be displaced. The nine year average daily use (1992 through 2001) through the West Entrance is about 570 snowmobiles. On a peak or high use day, approximately 1,000 to 1,200 snowmobiles enter YNP through the West Entrance. Beginning in 2004-2005, alternative 2 requires an interim daily use limit of 500 snowmobiles from the West Entrance. On an average use day this alternative would result in moderate to major adverse effects on the 70 to 100 snowmobile riders who would be displaced from that opportunity daily.¹² Visitors who wish to enter through the other three YNP entrances would not be affected because the proposed interim use limits at those gates exceed historic peak use numbers. The most restrictive use limit under alternative 2 would limit snowmobile use to 1,300 per day. Using an average winter season of 82 days this alternative could accommodate 106,600 snowmobiles. The average number of snowmobile *passengers* that enter the park annually is 80,315. This alternative would more than accommodate peak years such as 1993 when 91,196 snowmobile passengers entered the park.

Overall the proposed use limits would result in minor adverse effects on snowmobile enthusiasts. Because use limits at other entrances exceed historic use numbers access would be available if a reservation system were implemented. Areas of the park that have not previously experienced high levels of snowmobile use may experience an increase in snowmobile use.

The late night closure from 8 P.M. to 7:30 A.M. (8:30 AM from the West Entrance) would result in moderate adverse effects due primarily to visitor inconvenience. Nighttime closures

¹² This analysis makes no assumption that displaced snowmobile riders would choose to ride a snowcoach instead and makes no assumptions about the double passengers on snowmobiles.

would eliminate the opportunity for some visitors to dine at Snow Lodge or the Mammoth Hotel in the evening and then access lodging outside or inside the park respectively. The late morning opening would result in a reduction of vehicles operating during the early morning hours. This action would result in negligible to minor beneficial improvements in opportunities to ski or snowshoe near Old Faithful without the smell and sound of snowmobiles.

Availability of information. Surveyed winter visitors indicate that the availability of safety information is very important. Accurate and readily available information about safe travel practices and winter conditions is one of the suggested management actions that received a high level of support from most respondents. The additional information and education programs proposed under this alternative would result in major beneficial effects for all visitors. Several of the implementation strategies under this alternative, particularly the "bison brigade" and increased ranger patrols would result in moderate improvements to the visitor experience.

Quiet and solitude. Most survey respondents felt that natural quiet and solitude was important to the quality of their park visit. Because of the requirements in this alternative for quieter snowmobiles, opportunities for quiet will increase. This alternative allows for a substantial increase in snowmobile use from the North and East entrances. Snowmobile users that currently enjoy entering the park from the West Entrance of YNP may be displaced to other areas of the parks. This displaced use would adversely effect the ability of some visitors to find solitude in the park.

This alternative would result in an average noise level that exceeds 50 dB over 100 feet from the road for 172 miles of groomed road and exceeds 10 dB over 4000 feet on 13 road segments. This is a minor increase over alternative A in the FEIS, and a moderate to major increase over alternatives 1a and 1b in this SEIS. Although technology would improve, there would be little reduction in overall vehicle numbers in this alternative.

Motor vehicles in this alternative would be audible over 53,090 acres for greater than 50% of the time. Travel corridors encompass approximately 10,000 acres. Vehicle noise in this alternative would therefore result in moderate adverse effects on backcountry users when compared to alternative A in the FEIS.

Clean Air. Clean air was important to most visitors (Littlejohn 1996). Surveyed visitors indicated a moderate to high level of support for management actions requiring clean and quiet snowmobiles (Duffield et al. 2000c; Borrie et al. 1999; Wyoming 2001).

Under alternative 2 snowmobiles would be required to meet emissions requirements. Although this alternative decreases snowmobile use through the West Entrance it also allows for a substantial increase in snowmobile use from other park entrances. Cleaner snowmobile emission requirements and prepaid passes specified under this alternative would result in a minor to moderate increase in opportunities to experience clean air when compared to alternative A in the FEIS, due to improvements in snowmobile technology. This alternative would result in a moderate to major decrease in opportunities to experience clean air near the West Entrance and Old Faithful when compared to alternatives 1a and 1b. Although technology would improve, there would be little reduction in overall vehicle numbers under this alternative.

Conclusion

Snowmobile users would experience little change in opportunities to view wildlife and scenery from alternative A as described in the FEIS. However, the quality of those experiences would be moderately and adversely affected for some visitors, particularly on peak use days. There would be few changes in the effects relating to safety from alternative A. There would be a minor to moderate beneficial impact to visitor experience due to increased availability of information, interpretation, and winter programs. There would be minor improvements relative to opportunities for quiet and solitude. Opportunities to appreciate clean air would be increased from alternative A providing a minor to moderate beneficial effect. Where oversnow motorized use occurs quiet and clean air would be facilitated by improved motorized technology.

The adaptive management provisions of this alternative require that if monitoring or scientific studies regarding winter visitor use, natural resources and other park values indicate that resource or experience thresholds are exceeded management actions will be implemented to mitigate the effects. If mitigation is unsuccessful visitor numbers could be reduced. These reductions would result in direct and localized adverse impacts to desired winter visitor experience. However, the long-term protection of these resources would provide moderate benefits to the protection of desired visitor experiences park-wide.

The Effects of Implementing Alternative 2 on Visitor Experience in Grand Teton and the Parkway

The amount and type of winter visitor opportunities offered in GTNP and the Parkway under alternative 2 are provided in Table 98.

Table 98. GTNP and the Parkway visitor opportunities available under alternative 2.

Opportunities	Miles or Areas	Length of Season	Other
Groomed motorized route	2.1	December to April [†]	8:00 PM to 7:30 AM
Groomed motorized route, snowcoach	0	December to April [†]	8:00 PM to 7:30 AM
Groomed motorized trail	34	December to April [†]	8:00 PM to 7:30 AM
Plowed road	100.1	N/A	
Ungroomed motorized trail or area	Jackson Lake	December to April [†]	8:00 PM to 7:30 AM

[†] Variable based on weather

Visitor Satisfaction and Experience in GTNP

Opportunities to view wildlife and scenery. Visitors on plowed roads, the CDST and fishermen on Jackson Lake would continue to enjoy wildlife and scenery viewing.

Safety (the safe behavior of others). Visitors would continue to perceive unsafe conditions along the CDST. There would be moderate adverse effects relating to safety by continuing the possibility of snowmobile-related motor vehicle accidents, and wheeled-vehicle accidents on the road segment from Moran Junction to Flagg Ranch. These safety concerns would increase as use of the CDST increases.

Quality of the groomed surface. The quality of groomed surfaces in this alternative would be similar to those described under alternative A in the FEIS on page 269.

The availability of access to winter activities or experiences. Visitors who enjoy snowmobiling would experience major beneficial effects for the majority of the winter season. Use limits proposed under this alternative for the CDST and Grassy Lake Road exceed historic peak daily use. There would be no adverse effects on snowmobile riders under this alternative.

Availability of information. There would be enhanced and increased visitor programs facilities and interpretive opportunities to better meet the expectation and need for information.

Quiet and solitude. See YNP alternative 2. Because of continued snowmobile use on Jackson Lake backcountry nonmotorized users would continue to experience moderate adverse effects on opportunities to experience quiet and solitude.

Clean air. See YNP alternative 2.

Conclusion

Negligible to minor adverse impacts on visitor experience relating to wildlife and scenery viewing would occur because of the elimination of motorized travel on the frozen surface of Jackson Lake. Anglers who use snowmobiles, however, would not be affected. There would be moderate improvements to safety by eliminating the possibility of snowmobile-related motor vehicle accidents, and wheeled-vehicle accidents on the road segment from Moran Junction to Flagg Ranch. There would be a minor to moderate beneficial impact to visitor experience due to increased availability of information, interpretation, and winter programs. There would be a minor improvement relative to opportunities for quiet and solitude and minor to moderate improvements in opportunities to appreciate clean air. Where oversnow motorized use occurs, quiet and clean air would be facilitated by improved motorized technology, however the number of oversnow vehicles would be increased.

The adaptive management provisions of this alternative require that if monitoring or scientific studies regarding winter visitor use, natural resources and other park values indicate that resource or experience thresholds are exceeded management actions will be implemented to mitigate the effects. If mitigation is unsuccessful visitor numbers could be reduced. These reductions would result in direct and localized adverse impacts to desired winter visitor experience. However, the long term protection of these resources would provide some moderate benefits to the protection of desired visitor experiences park-wide.

The Effects of Implementing Alternative 3 on Visitor Experience in YNP

The amount and type of winter visitor opportunities offered in YNP under alternative 3 are provided in Table 99.

Table 99. YNP visitor opportunities available under alternative 3.

Opportunity	Miles or Areas	Length of Season	Other
Oversnow motorized route	176	Late November to Mid-March	Late night closure 9 PM to 8 AM

Opportunity	Miles or Areas	Length of Season	Other
Oversnow motorized route — snowcoach only	14	Late November to Mid-March	Late night closure 9 PM to 8 AM
Oversnow motorized trail	0	Late November to Mid-March	Late night closure 9 PM to 8 AM
Plowed route	76	N/A	

Visitor Satisfaction and Experience in YNP

Opportunities to view wildlife: Because all oversnow routes would remain open to motorized travel opportunities to view wildlife would not be limited. However, because visitors riding snowmobiles and snowcoaches would be accompanied by a guide, wildlife viewing would rarely be a solitary experience.

Because guides are generally well informed on proper behavior when approaching and viewing wildlife, requiring all visitors to travel with a guide would improve the quality of the viewing experience. Guides would also be familiar with the movements and locations of various wildlife species and may improve wildlife viewing opportunities for visitors.

Opportunities to view scenery. Opportunities to view scenery would not decrease under this alternative because all oversnow routes would remain open and accessible to visitors. Trained guides have a greater familiarity with the parks and would be able to direct visitors to areas of special interest.

Safety (the safe behavior of others). Under this alternative, all visitors would enter the park accompanied by a guide. The added education and enforcement of safe riding behavior would result in moderate beneficial improvements. A reduction in overall vehicle numbers would result in a decrease in the potential for accidents.

Quality of the groomed surface. Adaptive management provisions for this alternative indicate that for Zone 3, groomed motorized routes—that groomed surfaces must remain no worse than fair 20% for each daily period of operation (approximately 2.6 hours per day). If this standard is exceeded, management actions include increased grooming and an adjustment of vehicle numbers when threshold temperature is reached. This strategy in addition to a reduction of snowmobiles entering from the West Entrance will result in a moderate to major beneficial improvement in snow road conditions and visitor satisfaction.

The availability of access to winter activities or experiences. The ability to snowmobile into the park would maintain the current most popular form of winter experience (more than

60% of users) resulting in major beneficial effects on snowmobile users. The nine-year average daily use (1991 through 2001) through the West Entrance is 570 snowmobiles. On an average peak or high use day, approximately 1000 to 1200 snowmobiles enter YNP through the West Entrance. The interim daily use limit of 330 snowmobiles from the West Entrance would result in major adverse effects on the 200 to 300 snowmobile riders who would be displaced from that opportunity daily¹³. Visitors who wish to enter through the other three YNP entrances would not be affected because the proposed interim use limits at those gates exceed historic peak use numbers. Under alternative 3 parkwide snowmobile use would be limited to 930 snowmobiles per day. Using an average winter season of 82 days this alternative could accommodate 76,260 snowmobiles. The average number of snowmobile *passengers* that enter the park annually is 80,315. This alternative would also not accommodate peak years such as 1993 when 91,196 snowmobile passengers entered the park.

The late season closure to snowmobiles under this alternative would result in the displacement of potential 12,600 snowmobile riders. This closure would result in a major adverse effect on visitors seeking that recreational opportunity. However, the increase in the range of recreational opportunities would result in major beneficial improvements for visitors who prefer to recreate without the sound and smell of snowmobiles.

The adaptive management provisions of this alternative propose management actions that would be implemented if resource or experience thresholds were exceeded. Management actions for sound, smoothness of groomed surfaces and visitor satisfaction include adjusting visitor numbers.

The late night closures from 9 P.M. to 8 A.M. would result in moderate adverse effects due primarily to visitor inconvenience. Nighttime closures would eliminate opportunities for some visitors to dine at Snowlodge or the Mammoth Hotel in the evening and then access lodging outside the park.

Availability of information. The additional information and education programs proposed under this alternative would result in major beneficial effects for all visitors.

Quiet and solitude. Because of the requirement in this alternative for quieter snowmobiles opportunities for quiet would increase. This alternative allows for greater than historic peak

¹³ This analysis makes no assumption on the number of snowmobile riders that may "ride double" if use limits are implemented.

use levels from the North, South and East entrances. Snowmobile users that currently enjoy entering the park from the West Entrance of YNP may be displaced to other areas of the parks. This displaced use would adversely effect the ability of some visitors to find solitude in the park.

This alternative would result in an average noise level that exceeds 50 dB over 100 feet from the road for 134 miles of groomed road and exceeds 10 dB over 4000 feet distant on 11 road segments. This is a negligible decrease over alternative A in the FEIS, and a moderate increase over alternatives 1a and 1b in this SEIS.

Motor vehicles in this alternative would be audible over 36,270 acres for greater than 50% of the time. Travel corridors encompass approximately 10,000 acres. Vehicle noise in this alternative would therefore result in minor adverse effects on backcountry users when compared to alternative A in the FEIS.

Clean Air. Under alternative 3, snowmobiles would be required to meet emissions requirements. Although this alternative decreases snowmobile use through the West Entrance it also allows for a substantial increase in snowmobile use from other park entrances. Cleaner snowmobile emission requirements, prepaid passes and a reduced number of vehicles would result in a moderate increase in opportunities to experience clean air when compared to alternative A in the FEIS. These alternative actions would result in a moderate decrease in opportunities to experience clean air near the West Entrance and Old Faithful when compared to alternatives 1a and 1b.

Conclusion

Snowmobile users would experience little change in opportunities to view wildlife and scenery from alternative A as described in the FEIS. However, there would be moderate and beneficial improvements in the quality of those experiences for some visitors. The use limit of 330 snowmobiles entering from the West would result in moderate to major adverse effects on approximately 300 snowmobile enthusiasts per day, particularly those who find entering from the West Entrance essential to their park experience. The use limit of 330 would result in moderate to major improvements to the groomed surface on that road segment. There would be moderate improvements to safety because of the emphasis on guided tours and snowcoaches under this alternative. There would be a minor to moderate beneficial impact to visitor experience due to increased availability of information, interpretation, and winter programs. There would be a moderate adverse effect relative to

opportunities for quiet and solitude when compared to alternatives 1a and 1b in this FEIS but moderate beneficial improvements in opportunities for quiet and solitude when compared to alternative A in the FEIS. Opportunities to appreciate clean air would be increased from alternative A and decreased when compared to alternatives 1a and 1b. Where oversnow motorized use occurs, quiet and clean air would be facilitated by improved motorized technology and reduced vehicle numbers.

The adaptive management provisions of this alternative require that if monitoring or scientific studies regarding winter visitor use, natural resources and other park values indicate that resource or experience thresholds are exceeded management actions will be implemented to mitigate the effects. If mitigation is unsuccessful, visitor numbers could be reduced (if successful numbers could be increased). These reductions would result in direct and localized adverse impacts to desired winter visitor experience. However, the long term protection of these resources would provide major benefits to the protection of desired visitor experiences park-wide.

Effects of Implementing Alternative 3 on Visitor Experience — Grand Teton and the Parkway

The amount and type of winter visitor opportunities offered in GTNP and the Parkway under alternative 3 are provided in Table 100.

Table 100. GTNP and the Parkway visitor opportunities available under alternative 3.

Opportunities	Miles or Areas	Length of Season	Other
Groomed motorized route	2.1	December to April [†]	8:00 PM to 7:30 AM
Groomed motorized route, snowcoach	0	December to April [†]	8:00 PM to 7:30 AM
Groomed motorized trail	34	December to April [†]	8:00 PM to 7:30 AM
Plowed road	100.1	N/A	N/A

[†] Variable based on weather

Visitor Satisfaction and Experience in GTNP

Opportunities to view wildlife and scenery. Visitors on plowed roads, the CDST and Jackson Lake would continue to enjoy wildlife and scenery viewing. No viewing opportunities would be available for snowmobile riders to view wildlife or scenery on Jackson Lake.

Safety (the safe behavior of others). Visitors would continue to perceive unsafe conditions along the CDST. There would be moderate adverse effects relating to safety by continuing the possibility of snowmobile-related motor vehicle accidents, and wheeled-vehicle accidents on the road segment from Moran Junction to Flagg Ranch. These safety concerns would increase if use of the CDST increases.

Quality of the groomed surface. The results of this alternative would be similar to those described in alternative A as described in the on FEIS page 269.

The availability of access to winter activities or experiences. Visitors who enjoy snowmobiling would experience major beneficial effects for the majority of the winter season. Use limits proposed under this alternative for the CDST and Grassy Lake Road exceed historic use. There would be no adverse effects on snowmobile riders who use groomed routes under this alternative. The closure of Jackson Lake to snowmobiles would result in major adverse effects on visitors who cannot ski or snowshoe to fishing areas. The exclusion of motorized travel from the Lake would also result in limiting some access to Webb Canyon and other backcountry areas. However, nonmotorized use on the Lake would be enhanced

Availability of information. There would be enhanced and increased visitor programs facilities and interpretive opportunities to better meet the expectation and need for information.

Quiet and solitude. See YNP alternative 3. Because snowmobile use on Jackson Lake is eliminated, nonmotorized users in the backcountry would experience moderate to major beneficial effects primarily due to a reduction in sound levels.

Clean air. See YNP alternative 3.

Conclusion

Negligible to minor adverse impacts on visitor experience relating to wildlife and scenery viewing would occur because of the elimination of motorized travel on the frozen surface of Jackson Lake. There would be moderate adverse effects relating to safety by continuing the possibility of snowmobile-related motor vehicle accidents, and wheeled-vehicle accidents on the road segment from Moran Junction to Flagg Ranch. There would be minor to moderate beneficial effects on visitor experience due to increased availability of information, interpretation, and winter programs. There would be a minor to moderate beneficial effect relative to alternative A in the FEIS on opportunities for quiet and solitude and opportunities

to appreciate clean air. Where oversnow motorized use occurs, quiet and clean air would be facilitated by improved motorized technology.

The adaptive management provisions of this alternative require that if monitoring or scientific studies regarding winter visitor use, natural resources and other park values indicate that resource or experience thresholds are exceeded, management actions would be implemented to mitigate the effects. If mitigation is unsuccessful visitor numbers could be reduced. These reductions would result in direct and localized adverse impacts to desired winter visitor experience. However, the long term protection of these resources would provide major benefits to the protection of desired visitor experiences park-wide.

IMPAIRMENT OF PARK RESOURCES AND VALUES

A determination of whether or not, or to what degree each alternative in the SEIS would result in impairment will be deferred until the decision is made.

In managing units of the national park system, the Service may undertake actions that have both beneficial and adverse impacts on park resources and values. However, by the provisions of the laws governing the NPS, the Service is prohibited from taking or authorizing any action that would, or is likely to, impair park resources or values. In addition, under other environmental laws, adverse impacts may be prohibited as well. By Director's Order, impacts that may constitute an impairment of park resources or values are to be evaluated and described in impact analyses contained within environmental documents produced by the NPS.¹⁴ Current NPS policy defining and providing direction on impairment issues is duplicated in the policy section of Chapter I (1.4.5 and 1.4.7).

Impairment is an impact that, in the professional judgement of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts.

An impact to any park resource or value may constitute impairment. An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is:

¹⁴ Director's Order 12, January 8, 2001. Section 4.7

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- Identified as a goal in the park's general management plan or other relevant NPS planning documents.

An impact would be less likely to constitute an impairment to the extent that it is an unavoidable result, which cannot reasonably be further mitigated, of an action necessary to preserve or restore the integrity of park resources or values. Impairment may occur from visitor activities; NPS activities in the course of managing a park; or activities undertaken by concessioners, contractors, and others operating in the park.

The finding documented in the record of decision dated 11/22/00 was that, of the seven alternatives evaluated in the FEIS, only one did not exceed a level of impairment considered pursuant to NPS policy. This was the essential basis for selecting the alternative that eliminates snowmobile and snowplane use, as described in the rationale for the decision in the ROD. Alternative G in the FEIS, or the decision currently in place, was found not to result in impairment of park resources or values whose impacts are disclosed in the FEIS. In all other FEIS alternatives, current snowmobile use in YNP was found to impair air quality, wildlife, the natural soundscape, and opportunities for enjoyment of the park by visitors. In GTNP, impairment was found to result from snowmobile and snowplane use on the natural soundscape and opportunities for enjoyment of the park. In the Parkway, impairment was found to result from snowmobile use on air quality, the natural soundscape, and opportunities for enjoyment of the park. These findings were made for all alternatives with snowmobile use, including those that would have required phased-in use of cleaner and quieter snowmobiles in accordance with set objectives for emissions and sound. It was determined that there was no way to mitigate the impairment short of reducing the amount of use as determined by an effective carrying capacity analysis, or by imposing a suitable limit unsupported by such an analysis (ROD, pages 18-19).

DIRECT, INDIRECT AND CUMULATIVE IMPACTS ON ADJACENT LANDS

Possible impacts on adjacent lands resulting from each of the seven alternatives are disclosed in the FEIS on pages 434 through 474. The analysis in this SEIS is tiered to the FEIS and summarized here. There is no new information that would substantially alter the analysis of effects for the FEIS alternatives. The discussions below, summarized as they are, are adapted as possible to the SEIS alternatives.

Potential effects on lands within the GYA other than the three national park units is discussed in this section. The USFS; the States of Wyoming, Montana, and Idaho; and five counties surrounding the park units (all cooperating agencies in this EIS, see Chapter I and Appendix A of the FEIS) provided information for effects analysis in this section. Because the potential for impacts on adjacent lands (apart from economic impacts) is primarily due to possible displacement of winter recreation use from the parks, an analysis of displacement introduces the disclosure of possible impacts.

Possible Conflicts with other Land Use Plans, Policies or Controls

CEQ Regulations (40 CFR 1502.16(c)) require discussion of possible conflicts between the proposed action and objectives of land use plans, policies, or controls for the area concerned. The cooperating agencies represent the jurisdictions in which such conflicts might occur.

Counties. The chief concerns expressed by counties have to do with economic impacts of changes in park management (i.e., changes in access or mode of access, and recreational opportunities available from each gateway). Possible effects relating to loss of jobs or income in adjacent communities are disclosed in the *Socioeconomics* section, Chapter IV. Such impacts would not affect local government land use plans, other policies, or controls. This is largely because the essential objectives of park management have not changed, but the means by which they are to be attained could be altered. Teton County, Wyoming, expressed the desire that GTNP would be consistent with the county's new transportation plan. There is nothing in any winter use plan alternative that changes the transportation interface with the county. The park has initiated a separate environmental analysis to review year-round transportation needs in the park related to the county plan.

States. For the FEIS, the cooperating States did not indicate specific conflicts with any plan objectives. However, it can be assumed from their comments that existing snowmobile use does not violate any state or federal standards for air or water quality in or outside the parks. The State of Montana expressed concerns about displaced recreational use and its potential impacts in the areas of safety and wildlife management. These concerns are discussed in the Montana section below. It can be inferred that if significant use is displaced to state jurisdictional lands, some state objectives might not be met without further management. Wyoming's chief concerns had to do with possible declines in snowmobile tourism to the state through loss of recreational opportunities, and related economic effects. It can be inferred that this would conflict with state level tourism and recreation plan objectives. Similarly, Idaho was concerned about impacts of possible displacement on recreational

experience, groomed trail quality, and grooming expense – possibly conflicting with local plans and controls. The NPS has determined that there is no indication of any possible conflict with county land use plans for any alternative because land allocations and basic objectives in the parks would not change significantly. There is no new information from cooperating states that alters this assessment.

National Forests. All adjoining national forests have forest plans in effect. The Winter Visitor Use Management Assessment (GYCC 1999) identified conflicts relating to winter use. Most conflicts include motorized use and related infrastructure needs, wildlife impacts, and displacement of nonmotorized uses. The assessment indicates that most such conflicts can be handled within the framework of current forest plans, and the rest by forests during upcoming plan revisions. Considering possible displacement of snowmobile use from the parks, the Bridger-Teton National Forest indicates that increased use would destabilize a local balance between nonmotorized and motorized use, and not meet plan objectives. Similarly, the Caribou-Targhee National Forest states that increased use could exceed existing infrastructure and result in the need to amend its new plan. The NPS interprets this conflict as follows for all the forests involved. The forests have standards and guidelines that relate to quality experiences within the spectrum of recreational opportunities. Some forests do not have direction specific to winter use and recreation experience objectives. However, increased use could cause facility capacities to be exceeded. It could also cause heavy trail use that would not meet implied standards for quality use in a given management area. This impact indicates the need for management action to bring use into conformance with the plan – per the analysis in the Winter Visitor Use Management Assessment. The issue is nearly moot since the national forests indicate they are already at a threshold without any park management changes.

Displacement of Snowmobile Recreation Use to Adjacent Lands

To perform additional effects analysis on forest lands, the USFS requested the NPS provide information on how use would change in the GYA as a result of each winter use alternative for the parks. The NPS maintains that such information is speculative. Many different scenarios can be constructed for the same basic situation (for example, plowing the road from West Yellowstone to Old Faithful). Additional permutations are added when multiple alternatives must be dealt with, and even more when dealing with four major gateways and several other access routes. A partial list of possible considerations follows. Many nonresident visitors that presently snowmobile in the parks also snowmobile on the adjacent

national forests during the same trip. If they cannot snowmobile in the park from the gateway of their choice, they could:

- Continue to visit in future years but spend their time exclusively on national forest lands. The net increase would be the one or two days per trip previously spent in the parks.
- Continue to visit in future years but spend their time on national forest lands as before, and shorten their trip.
- Decline to come to the GYA and forego both national forest and park experiences.
- Continue to visit the GYA, spend as many days on the national forests as they do now and visit the parks using another gateway or a different mode of transport.

Other considerations include the possibility of attracting new visitors with new preferences, and different local users. Some people that have not come to the parks in the past might choose to do so because of available mass transit opportunities, either on plowed roads or groomed, oversnow routes. Such visitors could split their trips to spend a day snowmobiling on the adjacent national forests. Local snowmobilers would likely continue to use national forest lands as they have in the past. If they can no longer use the parks as they have traditionally done from their local community, they could:

- Enter the parks from another available gateway.
- Leave the region and go elsewhere for one to several trips over the season.
- Curtail their activity overall.
- Spend more time on local national forest lands.
- Visit national forest lands near of other gateways.

The development of a quantified scenario for future recreation use by alternative is speculative. The NPS provided scenarios of recreation displacement by alternative in the FEIS. These represent the most reasonable outcomes based on known preferences of current visitors through visitor surveys and current use at each park gateway.¹⁵ Appendix J in the FEIS provides supporting computations for this displacement analysis, including assumptions and methods.¹⁶ The following analysis is brought forth from the FEIS and applied to the SEIS alternatives.

¹⁵ CEQ Regulations at 40 CFR § 1502.22(b) address incomplete or unavailable information. Definitive information about what people would do under a variety of scenarios cannot be obtained. The best available data is from visitor surveys (Duffield 2000) designed to ask pertinent questions of current winter visitors in the parks. The results indicate what people may do under circumstances posed by key features of EIS alternatives. These surveys are also the basis for impacts described in the socio-economic section and are fully cited therein.

¹⁶ As a cooperating agency, the USFS advocates the use of a worst-case scenario for displacement that might occur in each alternative. The worst-case might be represented by the total amount of park visitation by gateway or otherwise that would no longer be able to use that entrance. What those displaced visitors might do is highly speculative.

Alternative Displacement Scenarios

Alternatives 1a and 1b

Alternatives 1a and 1b would be the same as in alternative G from the FEIS. Based on survey responses of current winter visitors about what the visitor would do if the parks were open for snowcoach access only, total visitation to the GYA by those who live outside the 5-county area would be reduced by 33.4%. Nonresident visitors account for about 80% of park visitation. Nearly 60% of the visitors who snowmobiled on their trip said they would visit the GYA less frequently. The 33.4% reduction is a net change. It takes into account visitors who said they would visit more often in this circumstance, and those who said they would visit the same, but shift their use to other areas of the GYA (e.g., from the parks to the national forests). This means that total visitation to GYA national parks and adjacent national forests by nonresidents could decrease by that amount. Visitation numbers are unavailable for national forests, but an across the board decrease of 33.4% could offset or exceed any potential increase in use locally as a result displaced park use. Considering a net decrease in use in GYA national parks and on adjacent national forest lands in this alternative, about 5,230 snowmobile trips (into the parks annually) are associated with visitors who indicate they would visit in the GYA the same amount, but would go to other destinations. A total of about 65 snowmobile trips daily could be displaced to other available lands outside the parks near all gateways. This would be in addition to resident visitors (accounting for about 20% of park visitation) who currently recreate on adjacent lands.

Alternative 2

This alternative is, in respect to amount and type of access and the allowable snowmobile use, essentially the same as in FEIS alternative A.¹⁷ Under alternative A there would be no redistribution of use other than what may happen at the influence of events unrelated to winter use management in the parks. Any impact on use distribution resulting from the requirement for use of cleaner and quieter snowmobiles would be the same as in alternative 3, so this effect is ignored. SEIS alternative 2 proposes an interim cap on use that is generally higher for all gateways of the three parks. The proposed interim cap at the west entrance of YNP in the third year of the phase-in is about the same as the current average daily entrance volume. On days exceeding 1,400 snowmobiles coming into YNP, there could be some diversion to national forests. On the average, on such days, about 50 snowmobiles

could be diverted from the West Entrance. Also, in alternative 2, Teton Park Road in GTNP would be closed. Current use consists mostly of local visitors, who could be displaced to the Parkway north of Flagg Ranch and YNP, or to lands on the Bridger Teton National Forest. An average of 10 daily snowmobile visits could be displaced in this fashion. Displaced use in this alternative is negligible.

Alternative 3

This alternative is, in respect to amount and type of access, essentially the same as in FEIS alternative A and SEIS alternative 2, above. The essential differences are associated with the amount of allowable use entering the park system at West Yellowstone, the requirement for use by guided tour only, and the prohibition on motorized use of Jackson Lake. Any impact on use distribution resulting from the requirement for use of cleaner and quieter snowmobiles would be the same as in alternative 2, so this effect is ignored. Even though the allowable use at West Yellowstone is decreased, the difference is made up by allowable use at the other gateways. Therefore, an argument can be made that displacement of West Yellowstone use would not affect adjacent lands but would be redistributed to other areas of the park. Alternatively, the same amount of use could be experienced in West Yellowstone, while those who wish to enter the park may need to pre-plan or reserve space with a guide having permitted use in the park. This could result in several scenarios:

- lengthier stays in West Yellowstone with the potential for increasing snowmobile visitor days on adjacent national forest lands;
- redistribution of use temporally within a single use season;
- redistribution to other park gateways;
- postponement of trips to later years;
- use of snowcoach access instead of snowmobile;
- greater numbers of snowmobiles with multiple-riders;
- or a mix of all these.

Any scenario, according to our best available information, would involve the difference between the allowable use at West Yellowstone of 330 and the average daily entrances of about 530, or about 200 snowmobiles per day. On peak days, especially from the West, several hundred snowmobiles could potentially be diverted until such time as the use has adjusted around the GYA. It would also involve possible displacement of an average of 40-

¹⁷ Alternative A in the FEIS essentially represents the existing condition both then and now. See discussion of existing condition in Chapter I of this SEIS. Since access by snowcoach only has not yet been implemented even though it is the current management decision, conditions associated with essentially uncontrolled snowmobile use still prevail in the three park units.

45 snowmobiles per day on Jackson Lake and the Teton Park Road. The effect on visitation by a requirement for use by guided tour only is not calculable. However, NPS assumes that, because of the apparent high demand for access, the fully allotted use at West Yellowstone will be taken. With this assumption, no displacement would result strictly because of this requirement.

Impacts of Displaced Recreation Use on Adjacent Lands

Alternatives 1a and 1b

The scenario of use displacement indicates that substantially fewer nonresident snowmobilers would visit the GYA. Therefore, this displacement would not affect adjacent lands in the GYA. Resident users would be relatively unaffected because, for the most part, they currently recreate primarily on adjacent lands. On balance, the displacement has economic consequences disclosed in the socioeconomic section, while decreased use (from displacement) would relieve pressure on national forest infrastructure and natural resources.

Alternative 2

The scenario of use in this alternative is essentially unchanged from present snowmobile use patterns. Because no displacement in regard to current levels or locations of use would occur, there would be no effects on adjacent lands.

Alternative 3

Any scenario of displaced use, according to the best available information, would involve the difference between the allowable use at West Yellowstone of 330 and the average daily entrances of about 530, or about 200 snowmobiles per day. This amount of displacement could be divided among use on locally adjacent lands, use at other park gateways, use that comes at other times of the year, or that no longer visits the GYA. The effect of displacement would be limited to the national forests near West Yellowstone, in quantities ranging from zero to 200 snowmobiles per day. This would not appear to be a significant impact. Also, it is possible that the current average level of visitation in the park from West Yellowstone could be accommodated within the allowable limit by increasing the number of multiple riders on snowmobiles.

CUMULATIVE IMPACTS

The alternatives evaluated in this SEIS are within the range of alternatives for which cumulative effects were analyzed in the FEIS. That analysis appears in the FEIS on pages 478-485. The discussion in this document is tiered to that in the FEIS. Cumulative impacts

on resources and values for which analysis of effects is presented in the SEIS are discussed here.

Assumptions and Methodology

Cumulative impacts analysis considers the degree to which any direct or indirect effects from proposed actions adds to or detracts from the possible effects of other past, present, or reasonably foreseeable actions. Since effects of actions are specific to each impact topic, resource or value of concern, the types of actions and overall nature of impacts considered in this analysis are disclosed for each. Each impact topic is associated with a specific area of concern, and with impact sources that could affect the resource within that area. If an action or an alternative could have a direct or indirect effect, then this effect is considered additive with the effects of other impact sources. Conversely, if an action does not have a direct or indirect effect, no additive cumulative effect exists.

Socioeconomics

The appropriate level for viewing cumulative economic impacts is at the aggregate level for the GYA. As noted in the FEIS, the counties of the GYA are in a period of general prosperity, characterized by economic growth and low unemployment. This growth is largely fueled by desirable residential and quality of life environments, increasing tourism, and the ability of independent entrepreneurs to be located in desirable working environments some distance from their key markets. This is more than offsetting the decline of the traditional resource extraction industries in the regional economy, although it should be noted that average wages between the two sectors are not equal (with resource industries' being generally higher). During the general trend of growth through the period, it should be noted that annual levels of tourist visitation have been static or decreasing in some places during the past two years. To the extent that the alternatives tend to increase recreational visitation, this is additive to the existing trend. To the extent that the alternatives tend to reduce recreational visitation, the negative impacts are somewhat offset by the positive regional economic trend related to wildlife and natural environment. This is the only cumulative impact identified in this section. All alternatives evaluated in both the SEIS and the FEIS are intended to maintain the current level of recreational visitation in the parks, although modes of access differ. Therefore, the cumulative impact identified would appear not to vary substantially within the economic region by alternative.

Air Quality

Area of Concern. The area of concern includes the airshed described by all three park units and by adjacent Class I areas on national forests. Although ambient air pollution generated at great distances beyond the park boundaries are of concern relative to air quality in the park, it is unreasonable to consider the whole of the western United States as an area of concern.

Potential Impact Sources. Additional pollution comes from regional industry located within 150 km of the park. Industries include oil and gas processing, power plants, and industrial combustion. Levels of nitrates found in YNP's snowpack can be related to regional industry (Ingersol et al. 1997). Current impact sources within the parks that could affect park air resources during the winter include emissions from 2-stroke engines and other motorized wheeled vehicles (or internal combustion engines) that operate on open roads within the parks, as well as wood-burning stoves. During other seasons, human-related sources of pollution include motor boats, gasoline powered maintenance equipment, recreational vehicles, busses, generators, ambient sources, automobiles, campfires, and road material processing equipment. Forest fires in both the parks and national forests impact air quality during the summer and fall seasons. There is no known connection between potential sources of air pollution in the winter and potential sources in the summer. Therefore, these sources are not additive as cumulative effects. Effects on vegetation, or other air quality related values from auto emissions, are largely hypothetical. Such an impact could be attributed to the large amount of summer automobile use when plants are actively respiring.

Additional Impact. In YNP and GTNP obvious visual effects of air pollution are usually short term and local. The cumulative effect of winter use, added to other possible sources of pollution in the parks, is considered to be short term and localized around parking destination and staging areas, entrance stations, and attractions such as Old Faithful. Effects other than visibility are of concern in these local areas, including health impacts. In alternatives 2 and 3 the application of "cleaner" technology could result in a net reduction of cumulative impacts within the area of concern, relative to the existing condition. In alternatives 1a and 1b, elimination of snowmobiles could significantly reduce the risk of degrading air quality related values in these Class I areas. In these alternatives, increased snowcoach use (relative to current use) would offset some of the gain, but the amount of air pollution generated per visitor would be significantly lower.

Wildlife

Bison

Area of Concern. The area of concern is that which is used by bison for wintering and seasonal migration. Generally, the area includes the corridor and adjacent available winter forage areas in the northern area of YNP and into Montana, and the western corridor along the Firehole and Madison River. The bison issues were addressed in the Bison Management Plan/EIS referred to in *Other Plans and Environmental Analyses*, Chapter I.

Potential Impact Sources. Because the area of concern is tied to bison winter habitat, impact sources include winter uses — motorized and nonmotorized — that displace bison from that particular habitat or render the habitat unusable for them. Activities such as trail grooming that facilitate bison movement in the winter (with less energy expenditure) also facilitate the recreational uses that can stress bison and cause higher energy expenditures. Bison movement along groomed and open roads can lead to the complex economic and social issue of migration to lands beyond park boundaries. Bison have been shown, however, to leave the park more in response to a variety of circumstances, and often not on groomed surfaces. For further evaluation of impact sources refer to the Bison Management Plan/EIS. Actions being considered in the Bison EIS include closing sections of road to winter motorized use and limiting bison use of groomed surfaces.

Additional Impact. For consideration of the total cumulative impact on bison, and how winter use contributes to it, this analysis incorporates the Bison Management EIS and Plan. Refer also to the disclosure of direct and indirect effects earlier in this chapter.

Ungulates other than Bison

Area of Concern. The area of concern includes habitat for various species within the three park units and other seasonal habitat beyond the parks' boundaries. Ungulate species are migratory and some herd units will disperse onto adjacent jurisdictions and land ownership primarily for winter habitat and forage.

Potential Impact Sources. Other impact sources include those that might occur on adjacent lands. This includes conflicts with other human use activities such as ranching, hunting, and general recreation. Development on private lands, loss of open space habitat, or road construction on other federal jurisdictions are other possible sources. Within the parks, similar actions represent impact sources — housing and road construction, grazing in GTNP,

as well as increased recreational use. The most relevant impact sources are those which occur during the winter, on or off the parks.

Additional Impact. The direct and indirect effects described for winter uses in the parks are key limiting elements for cumulative impacts. Stressed animals or herds whose winter forage options have become limited are likely to be affected cumulatively, through the additional impacts imposed by winter recreation use in the parks. Alternatives that limit all winter recreational use to trails away from thermal areas and close backcountry areas would decrease adverse cumulative impacts on ungulates.

Natural Soundscape

Areas of Concern. The area considered for cumulative impact assessment is the natural soundscape within the boundaries on three park units.

Potential Impact Sources. Because individual sources of sound are transient and short lived, the potential cumulative impact on the winter soundscape are those sounds occurring during that time. Sounds other than those that naturally occur in the park units during the winter include the sound of wheeled vehicular traffic along open roads, the sound of oversnow vehicles on groomed routes, aircraft overflights, and sounds attendant to facility developments open in the winter.

Additional Impacts. Where open facilities coincide with roads and oversnow motorized activities, the natural soundscape is impacted. There are areas in the parks where the total cumulative effect is such that it renders the natural soundscape to be seldom evident for most of a winter day. On a relative scale, there would be a lower level of cumulative impact under alternatives 1a and 1b, followed by alternative 3 and then by alternative 2. The relationship is defined by the numbers of vehicles allowed in each alternative.

Visitor Experience

Areas of Concern. The area considered for cumulative impact assessment is that within the boundaries of the three park units.

Potential Impact Sources. Because visitor experience is a multi-faceted value, during the winter it can be impacted by a large variety of sources. This SEIS illustrates the sights and sounds of a variety of modes of transport including buses, trucks, groomers, and autos. Visitor experience is also impacted by the numbers of other visitors in addition to their modes of transport. Ambient human-caused noise such as aircraft overflights generally affect visitor experience. When facilities such as lodges, restrooms, or comfort stations do not

accommodate the amount of visitor use (crowding), the quality of the experience declines. Responding to this issue, the number of facilities can grow to a point where the park no longer reflects its mission of providing a natural environment. In terms of impacts, all potential sources boil down to the number and the relative obtrusiveness of other people, facilities and transport vehicles. As these sources increase per unit area other impacts may be evident such as the impact of viewing disturbed wildlife as a secondary impact on one's visitor experience.

Additional Impacts. The indices to cumulative impacts on visitor experience are the number and relative obtrusiveness of other people, facilities and transport vehicles. On a relative scale, there would be a lower level of cumulative impact under alternatives 1a and 1b, followed by alternative 3 and then by alternative 2.

ADVERSE EFFECTS THAT CANNOT BE AVOIDED

The range of adverse effects in SEIS alternatives lies within that range disclosed in the FEIS. Each alternative evaluated in both the FEIS and the SEIS, including implementation of the current management plan, would result in some impacts.

Impacts are discussed for human health and safety, the economic and social environment, physical and biological resources, and the experiential environment of the three parks. These elements are interrelated and interdependent, as is the nature of any ecosystem process and the human role in it. Therefore, the alternatives taken together display consequences, tradeoffs, benefits, impacts, and opportunity costs in a way that reveals the interdependent working of human and natural park systems. This means that, considering the human use and enjoyment of national parks, an adverse impact from one perspective is often a benefit from another. For example, a change from the existing condition to management under alternatives 1 or 2 results in the loss of experiential quality for snowmobilers in the parks -- although these visitors may still avail themselves of motorized access using snowcoaches. At the same time, visitors who have avoided the parks due to the presence of snowmobiles, or who have been unable to enjoy a quality experience due to their presence, will benefit from this change. Any alternative that has been evaluated can be viewed in the same light.

Potential unavoidable adverse economic impacts on the regional economy are disclosed for all alternatives that depart from the existing condition described as alternative A in the FEIS. The decrease or loss of snowmobiling opportunities in the parks readily equates to an adverse economic impact. These impacts are not considered irreversible or long term in the

context of the total economy. For some individual businesses, the effects may be more drastic. It is, however, in the nature of business to start or change course based on economic self-interest and survival. Long term economic impacts are not easy to determine because of this dynamic, and because the business world is adaptable and creative. So, as indicated in the analysis, it is possible that the negative regional impacts of some alternatives could be offset by a change in the type and mix of visitors coming to the parks.

Potential unavoidable adverse impacts on physical and biological resources are disclosed through the range of SEIS alternatives. These include impacts on air quality, wildlife displacement and habituation, and natural quiet. For the most part, any such impacts are short term (for the duration of the impact cause) and minor. Other possible minor to moderate impacts would be mitigated or avoided by the features of the alternatives or the recommended mitigation measures expressed in specific analyses.

Current impacts on human health and safety represent a major part of the purpose and need for action. Considering the existing condition described in Chapter III, with reference to the FEIS, most alternatives represent an attempt to improve factors relating to health and safety. The focal points regarding health and safety in this SEIS are air quality and emissions from snowmachines, motor vehicle accidents and behavior of various recreating user groups. The desired impact is beneficial in reducing these factors. Allowing the range of winter recreational use and access, which is implicit in the purpose and need, carries with it unavoidable potential for accidents. Unavoidable impacts are referred to in the beginning of *Effects Common to all Alternatives*, Chapter IV. These result from winter use of the parks at any level, and they include impacts on: natural soundscape; wildlife (collisions, displacement); safety; and visitor experience.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

An irreversible commitment of resources is defined as the loss of future options. The term applies primarily to the effects of using nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity that are renewable only over long periods. It also could apply to the loss of an experience as an indirect effect of a “permanent” change in the nature or character of the land.

An irretreivable commitment of resources is defined as the loss of production, harvest, or use of natural resources. The amount of production foregone is irretreivable, but the action is not irreversible. If the use changes, it is possible to resume production. An example of such a commitment would be the loss of cross-country skiing opportunities consequent to a decision allocating an area to snowmobile use only. Should the decision be changed, skiing experiences, though lost in the interim, would be available again.

From an economic or social perspective, there would be no irreversible commitment of resources from any of the alternative actions. However, alternatives to the current management situation that change recreational opportunities or affect visitors by displacing them from accustomed usage, would involve irretreivable losses. By the nature of alternative actions, those losses would be balanced by a gain in some other opportunity or resource benefit. Any perceived losses or tradeoffs in recreational opportunities would have both social and economic consequences that would be irretreivable, but not irreversible.

By virtue of the alternative actions, which are fully within the protective orientation of the national park mission, and the analysis of effects from them, there would be no irretreivable commitments of any resources. No environmental consequences have been determined that involve the permanent loss of a resource or jeopardy to the existence of any species on the basis of the proposed actions alone. Were it indicated that the presence of existing or proposed levels of snowmobile trail use could cause grizzly bear mortality, then there would be a risk of irreversible and irretreivable commitment of resources. As stated, no such impacts were determined in this analysis.

The four alternatives prescribe changes from the existing condition for different mixes of winter visitor experience. The changes are intended to address the purpose and need for action described in Chapter I, while sharply defining the public’s issues about the proposal. In alternatives 1 and 2, the consequences of those changes improve the quality or condition

of the parks' experiential values and resources. This includes improving values like air quality, natural quiet, wildlife species and habitat, and recreation experiences (motorized and nonmotorized) whose quality is dependent on those values. The achievement of such improvements is accompanied by some tradeoff in another aspect of winter recreation such as loss of snowmobiling opportunities, available modes of transport, redistribution of use, or regulating types of equipment allowed. All these changes or tradeoffs would be associated with an irretrievable loss of the kind indicated. Conversely, for alternatives that provide a full range of winter recreation opportunities, including snowmobiling, there would be tradeoffs representing irretrievable losses in types and qualities of other visitor experiences. For the range of alternatives a variety of irretrievable resource commitments would be made, but none would be irreversible.

THE RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

All the activities implied in the EIS alternatives could be considered local and short term, in that they are specific to the three park units and are reversible actions. Long-term productivity is construed as the continued existence of the natural resources of the parks, at a sustainable and high level of quality, so that they can retain their inherent value and be enjoyed by the public. Depending on the magnitude, extent, and duration of impacts caused by short term uses, long-term productivity could be affected.

The analysis in the FEIS has shown few impacts from possible short term uses that would affect long term productivity as defined. It is the function of monitoring and mitigation, incorporated into park management, to ensure no such impacts result from implementation. Adaptive management is a dominant theme in all SEIS alternatives. Adaptive management addresses this relationship (monitoring and management) directly and programmatically. Otherwise every alternative would induce short-term effects on a variety of experiential values or resources that would persist for as long as the impacting activity is undertaken. Programmatic changes in opportunities affecting visitor experience and use (the "enjoyment" part of the mission) would continue for the duration of plan implementation.

CHAPTER V

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GLOSSARY

Act: The National Environmental Policy Act, as amended (42 U.S.C. 4321, et seq.) which is also referred to as “NEPA.” (40 CFR §1508.2)

Activity: Action, measures, or treatments that are undertaken which directly or indirectly produce, enhance or maintain forest and rangeland outputs, or achieve administrative or environmental quality objectives.

Ambient sources: As applied to air quality, or natural soundscape, ambient sources are those that make up the background characteristics or the environmental baseline. They are sources of emissions or sound that are not generated locally, but rather at a distance and are unrelated to local sources of emissions or sounds.

Bear-human conflict: In the parks, conflicts include injury or death to humans or livestock, damage to property, or the obtaining of human food. Conflicts outside of the parks also include damage to orchards, gardens, and beehives.

Bear-human confrontation: Interactions between humans and bears that include bluff charges or other threatening behaviors, or result in the displacement of bears in response to humans.

Best available information: Use of this term grows out of the section of CEQ regulations dealing with incomplete or unavailable information (40 CFR §1502.22). For an EIS, allowances are made for lack of data that may be essential to the making of a reasoned choice among alternatives.

Best available technology (BAT): The use of this terminology is in the context of the current need, absent any EPA regulatory standards, to develop snowmachines with reduced NAAQS pollution criteria emissions and reduced noise for use in national parks. The starting point for the best available technology at this time is that expressed by industry associated with production model 4-stroke snowmobiles. The expectation about this technology is that it is the subject of ongoing research every year in an effort to install continuing improvements for this purpose in a line of available production machines. Current data on new technology production machines is not available across the spectrum of pollutant criteria that is of interest in the national parks. Without continuous improvement, it is possible that the initial generation of machines will not meet adaptive management thresholds in time, and other measures such as reduced numbers will need to be imposed.

Categorical Exclusion: A category of actions which do not individually or cumulatively have a significant effect on the human environment and which have been found to have no such effect in procedures adopted by a Federal agency in implementation of these regulations (40 CFR §1507.3) and for which, therefore, neither an environmental assessment nor an environmental impact statement is required. (40 CFR §1508.4)

CEQ: Council on Environmental Quality.

CFR: Code of Federal Regulations.

Connected Actions: (40 CFR §1508.25) Actions are connected if they:

- (i) Automatically trigger other actions that may require environmental impact statements.
- (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously.
- (iii) Are interdependent parts of a larger action and depend on the larger action for their justification.

Cooperating Agency: Any Federal agency other than a lead agency which has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) for legislation or other major Federal action significantly affecting the quality of the human environment. The selection and responsibilities of a cooperating agency are described in 40 CFR §1501.6. A State or local agency of similar qualifications or, when the effects are on a reservation, an Indian Tribe, may by agreement with the lead agency become a cooperating agency. (40 CFR §1508.5)

Council: The Council on Environmental Quality established by Title II of the Act. (40 CFR §1508.6)

Cumulative Actions: Actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement. (40 CFR §1508.25)

Cumulative Impact: The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR §1508.7)

Decision Document: A record of decision documents a decision based on an EIS, and a decision notice or Finding of No Significant Impact (FONSI) documents a decision based on an environmental assessment.

Displacement — Recreation: The movement of recreation visitors from a preferred recreation site or area due to conflicts with other users, crowding, or management action.

Displacement — Wildlife: Wildlife movement away from areas of human activity. Displacement may be temporary (until the activity ceases) or long term. Long term displacement results in avoidance of certain habitats, and consequently may be especially adverse.

Ecosystem: Living organisms (biotic) together with their non-living (abiotic) environment, both forming an interactive system within an identifiable space or area.

Effects: (40 CFR 1508.8) These include:

- (a) Direct effects, which are caused by the action and occur at the same time and place.
- (b) Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial.
- (c) Cumulative, see cumulative impact.

Endangered Species: Any species (flora or fauna) classified by the U.S. Department of the Interior as being in danger of extinction throughout all or a significant portion of its range (not including insects determined to be pests).

Enjoyment: As used in NPS Management Policies , “enjoyment” means to derive benefit (including scientific knowledge) or inspiration from a park, and includes enjoyment both by people who directly experience the park and by those who appreciate it from afar.

Environmental Analysis: An investigation of a proposed action and alternatives to that action and their direct, indirect, and cumulative environmental impacts; the process which provides the

necessary information for reaching an informed decision and the information needed for determining whether a proposed action may have significant environmental effects and determining the type environmental document required.

Environmental Assessment: (40 CFR §1508.9)

(a) a concise public document for which a Federal agency is responsible that serves to:

(1) Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact.

(2) Aid an agency's compliance with the Act when no environmental impact statement is necessary.

(3) Facilitate preparation of a statement when one is necessary.

(b) Shall include brief discussions of the need for the proposal, of alternatives as required by section 102(2)(E), of the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted.

Environmental Document: Includes the documents specified in 40 CFR §1508.9 (environmental assessment), 40 CFR §1508.11 (environmental impact statement), 40 CFR §1508.13 (finding of no significant impact), and 40 CFR §1508.22 (notice of intent). (40 CFR §1508.10)

Environmental Impact Statement (EIS): A detailed written statement as required by section 102(2)(C) of the Act (40 CFR §1508.11). May be a Draft EIS (DEIS) that has been published and is available for public comment, or a Final EIS (FEIS) that has been produced following the public comment period. The primary purpose of an EIS is to serve as an action-forcing device to insure that the policies and goals defined in the Act are infused into the ongoing programs and actions of the Federal Government. It shall provide full and fair discussion of significant environmental impacts and shall inform the decision makers and the public of the reasonable alternatives, which would avoid or minimize adverse impacts or enhance the quality of the human environment. Agencies shall focus on significant environmental issues and alternatives and shall reduce paperwork and the accumulation of extraneous background data.

Environmentally Preferable Alternative: An alternative that best meets the goals of section 101 of the National Environmental Policy Act and required by 40 CFR §1505.2(b) to be identified in a record of decision. Ordinarily, this is the alternative that causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources. In some situations, there may be more than one environmentally preferable alternative.

Extraordinary Mitigation: Mitigation measures that are above and beyond the standard mitigation required for a particular activity. Standard mitigation is often inferred by agency

standards and/or guidelines, and generally must be applied under any circumstances, or is represented by generally accepted practices such as soil and water conservation measures.

Federal Agency: All agencies of the Federal Government. It does not mean the Congress, the Judiciary, or the President, including the performance of staff functions for the President in his Executive Office. (40 CFR §1508.12)

Finding of No Significant Impact (FONSI): A document by a Federal agency briefly presenting the reasons why an action, not otherwise excluded (40 CFR §1508.4), will not have a significant effect on the human environment and for which an environmental impact statement therefore will not be prepared. It shall include the environmental assessment or a summary of it and shall note any other environmental documents related to it (40 CFR §1501.7(a)(5)). (40 CFR §1508.13).

Floodplains: As defined by EO 11988, as amended, lowland and relatively flat areas adjoining inland and coastal waters including flood prone areas of offshore islands, including at a minimum, that area subject to a 1% or greater chance of flooding in any given year.

Flush: (Wildlife) An immediate, short-term behavioral response to disturbance that includes flight or running from a perceived threat.

Habituation: The process by which an animal becomes desensitized to a particular stimulus. In this document, habituation refers to wildlife that have lost their innate wariness of humans, usually in response to a positive association such as obtaining food. Animals typically habituate to stimuli that are predictable and nonthreatening, such as highway traffic and routine sounds.

Human Environment: Shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment...This means that economic or social effects are not intended by themselves to require preparation of an environmental impact statement. When an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all of these effects on the human environment. (40 CFR §1508.14)

Impairment: As used in NPS Management Policies , The “impairment” means an adverse impact on one or more park resources or values that interferes with the integrity of the park’s resources or values, or the opportunities that otherwise would exist for the enjoyment of them, by the present or a future generation. Impairment may occur from visitor activities, NPS activities in managing a park, or activities undertaken by concessioners, contractors, and others operating in a park. As used here, the impairment of park resources and values has the same meaning as the

phrase “derogation of the values and purposes for which these various areas have been established,” as used in the General Authorities Act.

Interdisciplinary Team: A group of individuals with skills from different resource areas. An interdisciplinary team is assembled to develop environmental analysis for a proposed action, in accordance with NEPA.

Irretrievable: A term that applies to the loss of production, harvest, and consumptive or nonconsumptive use of natural resources. For example, recreation experiences are lost irretrievably when an area is closed to human use. The loss is irretrievable, but the action is not irreversible. Reopening the area would allow a resumption of the experience.

Irreversible: A term that describes the loss of future options. Applies primarily to the effects of use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity that are renewable only over long periods of time.

Issue: A point of debate about the environmental effects of a proposed action. See also Significant Issue.

Jurisdiction by Law: Agency authority to approve, veto, or finance all or part of the proposal (40 CFR §1508.15). See also cooperating agency.

Lead Agency: The agency or agencies preparing or having taken primary responsibility for preparing the environmental impact statement. (40 CFR §1508.16) This also applies to environmental assessments. See also, joint lead agencies (40 CFR §1506.2(4)(c)).

Legislation: A bill or legislative proposal to Congress developed by or with the significant cooperation and support of a Federal agency, but does not include requests for appropriations. The test for significant cooperation is whether the proposal is in fact predominantly that of the agency rather than another source. Drafting does not by itself constitute significant cooperation. Proposals for legislation include requests for ratification of treaties. Only the agency that has primary responsibility for the subject matter involved will prepare a legislative environmental impact statement. (40 CFR §1508.17)

Major Federal Action: (40 CFR §1508.18) Includes actions with effects that may be major and which are potentially subject to Federal control and responsibility. Major reinforces but does not have a meaning independent of significantly (40 CFR §1508.27). Actions include the circumstance where the responsible officials fail to act and that failure to act is reviewable by

courts or administrative tribunals under the Administrative Procedure Act or other applicable law as agency action.

(a) Actions include new and continuing activities, including projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by federal agencies; new or revised agency rules, regulations, plans, policies, or procedures; and legislative proposals (40 CFR §1506.8, §1508.17). Actions do not include funding assistance solely in the form of general revenue sharing funds, distributed under the State and Local Fiscal Assistance Act of 1972, 31 U.S.C. 1221 et seq., with no Federal agency control over the subsequent use of such funds. Actions do not include bringing judicial or administrative civil or criminal enforcement actions.

(b) Federal actions tend to fall within one of the following categories:

- (1) Adoption of official policy, such as rules, regulations, and interpretations adopted pursuant to the Administrative Procedure Act, 5 U.S.C. 551 et seq.; treaties and international conventions or agreements; formal documents establishing an agency's policies which will result in or substantially alter agency programs.
- (2) Adoption of formal plans, such as official documents prepared or approved by federal agencies which guide or prescribe alternative uses of Federal resources, upon which future agency actions will be based.
- (3) Adoption of programs, such as a group of concerted actions to implement a specific policy or plan; systematic and connected agency decisions allocating agency resources to implement a specific statutory program or executive directive.
- (4) Approval of specific projects, such as construction or management activities located in a defined geographic area. Projects include actions approved by permit or other regulatory decision as well as Federal and federally assisted activities.

Mitigation (40 CFR §1508.20): Avoiding the impact altogether by not taking a certain action or parts of an action.

- (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- (e) Compensating for the impact by replacing or providing substitute resources or environments.

NEPA Process: All measures necessary for compliance with the requirements of section 2 and Title I of NEPA.

Notice of Intent: A notice that an environmental impact statement will be prepared and considered. (40 CFR §1508.22)

Park Resources and Values: Resources and values of a park whose conservation is essential to the purposes for which the area was included in the national park system, including both the Organic Act's fundamental purpose for all parks, as supplemented and clarified by the General

Authorities Act, and any additional purposes stated in a park's establishing legislation or proclamation. Under the Organic Act and the General Authorities Act, these resources and values always include, but are not limited to, all of the following, to the extent they are present in the park: the biological and physical processes that created the park and continue to act upon it; scenic features; natural landscapes; natural sounds and odors; water and air resources; soils; geological resources; paleontological resources; archeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites and structures; museum collections; native plants and animals; clear daytime vistas and night skies. The term also includes opportunities to experience enjoyment of the above resources and values, to the extent that can be done without impairing any of them. "Park resources and values," as used in Management Policies, do not include any attributes of a park whose conservation is not essential to the purposes for which a park was designated. For example, the term does not include non-native species or man-made structures that are not historic or prehistoric, unless their conservation is essential to a specific additional purpose for which an individual park was established.

Preferred Alternative: The alternative(s) which the agency believes would best fulfill its statutory mission and responsibilities, giving consideration to environmental, social, economic, and other factors and disclosed in an environmental impact statement. This type of alternative is not to be confused with the environmentally preferred alternative or the proposed action; they can be the same but often they are entirely different alternatives.

Programmatic EIS: An environmental impact statement designed to evaluate the relative effects of alternative plans or programs that will guide or prescribe alternative uses of Federal resources, upon which future agency actions will be based.

Programmatic Plan: A major Federal action, developed through the NEPA process, upon which future agency actions will be based. An EIS is normally written to provide choices for prescriptions and connected or related actions, whose eventual decision is the selected plan. See Major Federal Action.

Proposal: Exists at that stage in the development of an action when an agency subject to the Act has a goal and is actively preparing to make a decision on one or more alternative means of accomplishing that goal and the effects can be meaningfully evaluated... A proposal may exist in fact as well as by agency declaration that one exists. (40 CFR §1508.23)

Proposed Action: A proposal made by the lead agency to authorize, recommend, or implement an action to meet a specific purpose and need (see proposal).

Public Comment: Comments provided by interested or potentially affected parties on an environmental document during an official comment period, as required in NEPA.

Scope: The range of actions, alternatives, and impacts to be considered in an environmental impact statement. (40 CFR §1508.25)

Scoping: The procedure by which the agency identifies important issues and determines the extent of analysis necessary for an informed decision on a proposed action. Scoping is an integral part of environmental analysis.

Significant Issue: (see “issue”)... An issue that explicitly links the proposed action (or a feature of the proposal) to a potential environmental effect. Significant issues are those that are determined to be “deserving” of study” (40 CFR §1500.4, §1501.7, and §1502.14) within the context of the purpose and need for action, and can therefore become the basis for an alternative to the proposed action.

Significantly or Significance: This term includes both context and intensity (40 CFR §1508.27):

(a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality.

Significance varies with the setting of the proposed action. For instance, in the case of a site-specification, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

(b) Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

(1) Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

(2) The degree to which the proposed action affects public health or safety.

(3) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

(4) The degree to which the effects on the quality of the human environment are likely to be highly controversial.

(5) The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

(6) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

(7) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

(8) The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.

(9) The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.

(10) Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

Similar Actions: Actions which when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography. (40 CFR §1508.25).

Site-specific Actions: Actions that are specific and focused to a defined and limited place and time. In the context of an analysis, site-specificity usually refers to the analysis of a specific project in a defined geographic area, such as a construction project. Such projects are normally done in order to achieve the goals and objectives that are defined in a plan that has been approved through NEPA in a “programmatic EIS” and record of decision. See Programmatic EIS. See Major Federal Action.

Snowcoach: self-propelled, mass transit vehicles intended for travel on snow, having a curb weight of over 1,000 pounds (450 kg), driven by a track or tracks and steered by skis or tracks, having a capacity of a least 8 passengers.

Soundscape, natural: The natural ambient soundscape is the aggregate of all the natural sounds that occur in parks, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive and can be transmitted through air, water, or solid materials. The natural ambient sound level — that is, the environment of sound that exists in the absence of human-caused noise — is the baseline condition, the standard against which current conditions in a soundscape will be measured and evaluated.

Special Expertise: Statutory responsibility, agency mission, or related program experience. (40 CFR §1508.26). See also Cooperating Agency.

Tiering (40 CFR §1508.28): The coverage of general matters in broader environmental impact statements (such as national program or policy statements) with subsequent narrower statements or environmental analyses (such as regional or basinwide program statements or ultimately site-specific statements) incorporating by reference the general discussions and concentrating solely on the issues specific to the statement subsequently prepared. Tiering is appropriate when the sequence of statements or analyses is:

(a) From a program, plan, or policy environmental impact statement to a program, plan, or policy statement or analysis of lesser scope or to a site-specific statement or analysis.

(b) From an environmental impact statement on a specific action at an early stage (such as need and site selection) to a supplement (which is preferred) or a subsequent statement or analysis at a later stage (such as environmental mitigation). Tiering in such cases is appropriate when it helps the lead agency to focus on the issues that are ripe for decision and exclude from consideration issues already decided or not yet ripe.

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